the ROYAL COMMISSION on the NORTHERN ENVIRONMENT

LIFE ABOVE AND
BELOW THE 50th PARALLEL

Funding Program Report

ROYAL COMMISSION ON THE NORTHERN ENVIRONMENT

J.E.J. FAHLGREN, COMMISSIONER

LIFE ABOVE AND BELOW THE 50th PARALLEL

by:

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CHAPTER ONE

ECONOMIC BLOCKS

ONAKAWANA - TIMMINS

AND FRIENDS

SELF SUFFICIENCY

E C O N O M I C B L O C K

SEE WHAT WE CAN DO WITH WHAT WE'VE GOT

BY

MIKE ZUDEL

Many thanks to the following people for their moral support and for putting up with me till this beginning;

Dr. R.G.Rosehart
Scientific counsillor for the Royal Comm- on the future Electric Power Planning.

Dr. Arthur Porter
Chairman of the Royal Commission on the Electric power planning.

Mr. Marc Couse member of the Royal Commission on the Electric Power planning.

MrW. Ferrier
Manager of the Timmins Office of the Royal Commission on the Northern Environment.

Mr. Don Collins
Alderman for the City of Timmins.

Sincerely

Mike Zudol

M.Zudol

BASIC PLANS FOR THE ECONOMIC BLOCK OF

SMOOTH ROCK FALLS

ONAKAWANA COCHRANE TIMMINS

IROQUOIS FALLS

Water power Forest waste; saw dust, branches from logging trees, useless - shrubs, peat moss, waste from the surroun- ding communi- ties, Coal.....	Condenser heat to heat the hot houses, ↑ ELECTRIC GENE- RATOR.↓ Electrifying Railways and rail commuters, Industrial Economic Block.....	The end results. Small jobs, Food products, Hay fields, Grazing fields, Cultivated- forests, Access roads combined with summer drainage and winter roads.....

F O R W A R D

The format and continuity of this booklet is only a preliminary stage so further meetings and seminars could build a solid foundation for the regional communities where the highest and the lowest groups of the society could be employed. Employment which is of utmost importance.

The first chapter is the summary of the other chapters, it seems to me that it is important to see when the first step is anticipated, to see what one is stepping into.

On the technical side:

We are talking about matters that have never been done before, on a large scale, (Forest waste). New methods, new machines are needed, we know of some, some one has to get started and improve on as we go, but get started.

Decentralized manufacturing, growing food between frosts has to be implemented.

The 50^{o} up area is not such that huge assembly line manufacturing would be viable. The alternative is the Man and the Beast plus machine.

The way to extract and haul away the huge mineral and forest product was implemented. The self sufficiency block in this area is also essential. It would be an investment and a pilot project for other areas.

The following submissions are prepared and based on an old saying, "See what we can do with what we have got." We have no money but we have a lot of people so, maybe, we should invest in people.

Of course, industry was held up by people, pushed against the wall, so the industry turns back to machines. Only one question is left: What to do with People?

Keeping in mind people, energy, renewable energy, conserving fossil energy; put people back to work. This is what this presentation is all about.

Keeping energy in mind, reliability. The north is not very well secured in that problem, but the north is a bad energy guzzler. We import potatoes, practically all vegetables, including meat, from thousands of miles away. We did not have any conflict in a major proportion, not excluding armed conflicts, or any other problem that may have severed the umbilical cord; how would the north stand up to this kind of test? Not that we cannot do something about that ourselves by raising animals, growing food products, build more dependable standby system.

This presentation consists of four submissions filed with this Commission a few

years back, as I just mentioned, on the same basic idea, (to see what we can do with what we have got), in the north, we plan to learn how to transfer energy to serve man better, not just use it once and over; transfer it from one service to another. That is the point here.

The four major basic submissions that are presented here are the main cornerstones for an economic block.

The first submission is the basic groundwork. The second submission is to conserve energy we already have. The third submission is how to control the very essential commodity we need; eletricity. The fourth submission is how to harness river rapids for renewable electric power.

Submission Number 1. Coal Burning Electric Generator.

That submission deals with energy renewable non-renewable, conserving energy and, most of all, employing people instead of unemployment insurance and welfare, and a suggestion how to employ this plan; some help...

immigration from Holland and Mexico may be necessary.

Number 2. Insulation and Insulation Methods In Low Temperature Areas.

Millions of public funds are spent on that subject but the northern communities are not getting anything out of it. Methods of insulation introduced in the northern region are at least twenty years out of date. Insulation material available is good. Other insulation material could be easily manufactured to retrofit and insulate buildings.

Humidity and control of it is lacking in the northern areas for public health and structure preservation.

Number 3. Electric Peak Demand, 24 Hour Calendar.

As time goes, the electric load is multiplying much faster than electric supply is. There is no guarantee that electric power will not have to be rationed in the future by the supplier's control.

Northern Canada is in serious danger at present as of the electrical system. Electrical interruptions are not guaranteed. There is no spare backup system since the

northern climate is different -30°F. If there is any electrical interruption at that temperature for four to eight hours, the plumbing will be frozen. Old folks will be frozen. Because, at present, natural gas is controlled by electricity, the oil heating is controlled by electricity; of course, the electric heating is the same problem: If electricity stops, everything stops.

If there is any electrical overload or blackout, it will happen in the low and prolonged coldspell. The electric peak demand control would not save electricity but it would prevent extreme electrical overloads.

Number 4. Harnessing River Rapids.

This system is good for millions of electric horsepower in Ontario alone. There are many types of water wheels that have been around for centuries in the past. This system is different. It can use low head falls or low river rapids where a dam is not possible. The water chute and the special water wheel works by the weight of the water, more or less, rather than just the falls. It could be used on four feet drop of rapids. Also, the system could be built to four wire; black & white, red & blue system. In case

of overload, the blue, then the red could be dropped; white and black could be wired to one 15 amp single circuit; enough electricity to heat an electric kettle and an electric blanket for life-saving.

There are still other energy saving and generating methods. One of them is wind. Probably why wind power is not doing so well is because too much is expected of it; 50 KV or so. Maybe, if we were satisfied with 30 amps or 1 KV, three or four-foot roof-top fan generators, millions of them could be sitting up there; especially the high-rise areas where there is strong wind at street level, mid-level and top level.

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BLUFFING

This page came out in the middle of this book. I decided that perhaps I should start with it.

There are some proverbs; the old saying, that he or she bluff one's way through. Whatever the case may be. Trouble shooting, Experimenting Testing, is conveniently ignored in the North, Except the car Manufacturers,.

Bluffing is not an academic phrase. The technicians know that they can't get away with it. In the North, to my way of looking at things, bluffing is done by some architects, some constructing engineers, most of the building contractors, some medical doctors, and rightly so.

The reason for writing this book is to try to jolt the General Public and all the professionals that we have problems, that could be and have to be taken care of here.

For example, a machine designed in the 28th parallel, a well-engineered test run for 10 years, trouble-free service for all these years. Some of those machines and things are sitting on our roof tops; but, by no means trouble-free.

Many other things that were in good service over the years, in the lower parallels, that should be seriously looked into, are: Flat, built-up roof, (Right side up, or down), Rooftop, Heat and cool units, Refrigeration Condensers, Air or Evaporative.

All those things are here now with all their BTU Hogs, Minus testing, trouble shooting, Personal and facility. Northern Colleges and Universities should be doing that.

Introduction. Section 1.

The contents of this volume should not be one that will be read for pleasure, desire, or boredom.

No gloom & doom is preached. Just very hard common sense for the people that live in this Northern Area, because they like it here or have no other place to go to for one reason or another, "but you are here, and if you are here to stay, then you are part of a Population that came here from over-populated areas; Europe, South America, South of U.S.A." People practically from all over the world. They brought with them Living habits, Cultural habits, Housing habits, Building plans, etc. (Some of those plans do not fit into this cold climate.) At first the people just came here to work, live in a shack, make some money and go back, or to another part of America.

But now there is no place to go. It seems that we have a problem. Cultures, cost of living, housing, transportation, energy, renewable and fossil manufacturing, Labour depends on other areas on other Nations. All that has to be seriously looked into.

The following is my contribution to bring some of the problems to the public by suggesting how to get out of the problem or learn how to live with it. My suggestions are not accidental. I have lived through them all. So in that case read this Book carefully; it may be very beneficial to you.

So the following Submissions for self-Sufficiency is a Summary of long and hard work. If someone is interested to follow.

Life is a problem. It is a man-made problem. God has created a beautiful world, especially Canada. Just how to live and enjoy life in it, is man made. "Just as you make it." We have a set of rules to obey if one wants to succeed in life; God rules. Federal Government, Provincial Government, Local Government, and a most important one is Household rules. "The Home."

ENVIRONMENTAL FUTURE, THE THEME IS WHAT WE CAN DO WITH WHAT WE'VE GOT.

ONAKAWANA, 50°, Timmins Porcupine, a large economic block, or a large jigsaw puzzle? There may not be much that any of the Northern areas could do all by themselves,

above or below the 50°.
There is big chance for an economic block here but we can all ask ourselves a big question; What can the existing built-up Communities contribute towards the economic block or the Industrial Park?, without spending Billions in preparation.
ONAKAWANA could supply some Energy, and probably someother raw minerals for the block.
COCHRANE Heavy duty Rail rolling stock, repair and maintenance depot, local Manpower and public facilities.
TIMMINS Could supply: 1. Heavy duty Machinery maintenance, and repairs, 2. Hospitals, 3. Educational facilities, 4. Pleasure and recreational facilities, 5. Wholesale and Retail food distributing, processing, Meat Packing, and Canning, 6. Transportation, Rail commuters and union terminals, 7. Hothouses, Plastic farms, Small Farm producers, Summer grazing, etc.
All the rest of the built-up Communities can spare Manpower, and they are all equipped with Public utilities and services.
So spending Public money would only go towards production factors, employment, etc.

Unemployment Insurance, Education, Recreation, should be very seriously looked into. All eyes on occupation and production. Onakawana and Timmins could be an experimental example.

Some personal observation.

My trouble shooting Engineering came to me very early in my Life, O.J.T. Monkey see, Monkey do, kind of training, and in another part of the world. One example I would like to mention here is; I came from an area where villages were completely self-supporting, except sugar, sunday dress and foot wear.

Modern Collective Farms and food processing was introduced, in a lot of the cases not on a voluntary basis, all the small producers were eliminated then the large systems failed, some 20 years later shortage of food products fell to the starvation level, about 15 years ago another system appeared on the horizon approximately one acre lots were given to the young families to build a home, vegetable garden, a chicken coop, hog and whatever anyone can afford or want to do for himself.

Over a year ago I was there, I could see a

lot of happy home owners. Homemade smoke sausage, bacon, potatoes, and carrots in the vegetable bin, fresh eggs, chickens, lamb, etc. (of course the large mechanical farms are still there). Nothing wrong with that either, up to a point.

One could visualize in this Onakawana-Timmins area to be a large place, full of small food producers, small local manufacturers, Meat Packers, Food Processing, Canning, Large Supplementers, if not a total self-sufficiency.

ENVIRONMENT TROUBLE SHOOTING FOR TIMMINS NORTH AREA

Fossil fuel Generating is nothing new. Generating Electricity by wind is not new, Moving large ships by manpower is not new. Powering saw mills, Flour mills, Generating Electricity by water power is not new. What is new?

Spreading Asphalt over our best farmland is new. Building Multi-billion dollar Nuclear Power is new. Building large Factories where machines are replacing the Man is new. Building large Shopping Plazas where man has to have an Automobile to buy a loaf of bread is new. Building Systems that man has to have $500 a day automobile to get to work is new.

PLEASE NOTE

SOME SUGGESTIONS IN THIS BRIEF
WERE WRITTEN BEFORE SOME FACTS WENT
THE OTHER WAY, LIKE THE CART BEFORE THE
HORSE,OR PLAY TO-DAY AND WORK
TOMORROW

Building Homes for a single family with 200 to 600 amp.Electric service to light and pleasure, 3 to 500.000 BTUs to heat is new, Building large Arenas,Auditoriums,where interest and participation is very small, is new, Installing 150 H.P. Condensing Units for making ice for pleasure in an area where (10 H.P.air Handler) could maintain Natural ice for 4 to 5 months is new.

Large machines, Large thinking, Large automation, Large Labour organizations are getting us into Large trouble, The only surplus can be realized now is Large unemployment, in a lot of cases the unemployed are better off than the working partner, That is new.

What is really new is: The Tax payers are getting fewer, The Natural Resources are running out.
Perhaps we should start small practical thinking,.Go back where we started from. Let us look back into the first paragraph of this brief, We still have large rivers, water power, and the allmighty Manpower (Then we should---

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invest into things we have).
Take this area, for example; Smooth Rock Falls, Cochrane, Iroquois Falls, Porquois Junction, Porcupine, Timmins. Draw a line from Timmins to Smooth Rock and call this an Industrial Park.
We already have: Gold, Copper, Zinc, Silver, Lumber mills, and Paper mills. Let us see what we could do with that?
There is already Railway through all the Communities mentioned here, except Timmins to Smooth Rock Falls. (Shelf the Timmins Bypass and the Timmins-Smooth Rock Highway. Let us say that we should build the Railway first; a Direct Rail connection to the West.)

New Industry

Let us say that we will start with (1) A Coal Burning Electric Generator here. Make it a Combination Fossil Burner, it should burn; Garbage from all the Industrial Park, waste from the Paper mills, Clean the Forest from dead trees and shrubs and burn that, (this would minimize the bush fires).
Heat from the Unit condenser could be used to heat the Hothouse and a Plastic Farm. There are Peat moss deposits near to make

peat transplanters for the Hothouse and the Plastic Farm and some for sale probably. Chimney heat could be pumped and used to heat the administration buildings. High density building could be concentrated on, in a specific area for working couples and single workers, for a specific reason. Concentration should be planned on Industry first to stop duplication in transportation and importing such as: Bread, Eggs, Chickens, Potatoes, Beef, Pork, Turnips, Livestock, Green oats, Clover, Corn, Work clothes, Work boots, Street Clothes, etc.

Secondary Industry.

Copper Tubing, Copper wire, Copper Fittings, Small Electric Motors, Small copper components for the auto industry, Radios, Parts for T.V.s Anything that could be manufactured from the metals. Wood that is processed here.

Shipping finished products does not cost more than the raw material we are shipping now.

A lot of those items mentioned here could be made, sewn, assembled here. In private homes, as piece work, here and far North. Use the Manpower; give them work instead

of unemployment insurance and welfare. We do have to face the fact that we cannot compete in the world market. We are still selling some natural resources, where other countries we compete with have to buy the raw material from us. We still have a chance for survival, if we can ignore the situation, then we are in big trouble.. Assessment of the Generator, as of area. Onakawana or Timmins.

PRO'S;

Onakawana; Saving on Coal Transportation cost.

Timmins; No Transmission cost, No Transmission loss, Continuous Garbage supply, Continuous Forest waste supply, Condenser heat could be utilized to heat soil for a hothouse and a Plastic Farm. (A Hothouse and a Plastic Farm could turn this area into a major food industry). No time limit for theGenerator.

CON'S.

Onakawana; Disturbing the marine life with the Condenser heat, Transmission cost, Transmission loss. What becomes of the Generator after the Coal was used up?

CHAPTER 1, SUBMISSION #1

To elaborate on this chapter, I would like to pick up at random some subjects for this Volume only. So we can cover most of this necessary changes that will be needed to form that Economic Block.

What we do not want to do is to create some unwanted impact in any district or Quick Get Rid of some Natural Resources. (There was too much of that in the past.)

Very careful Planning, use the Renewable resources first. Fossil Energy where plentiful.

For example:

1. Onakawana: There are lignite deposits. Also, they have substantial Waterfalls that could be Harnessed without flooding, to generate Electric Powere that could be used for Electrifying Railways.

2. The Coal Deposit could be used to make fireproof insulation slabs to insulate construction of Brick, Concrete Blocks, or steel Buildings. Masonry , fireproof Insulation that is very badly needed up here, etc.

REGULAR & MECHANICAL CHICKEN FARMS

Some 150,000 population here and close to here. "With the Industrial Park" there will be more to come; but the customers are here.

What are we doing here for Beef and Chickens and Hogs? Beef, some beef is raised in the New Liskeard area. It is hauled to Toronto to be slaughtered, shipped back as fresh beef for the Market. Shipping livestock costs approximately $2.00 per truck mile. Shipping the same beef back in refrigerated truck costs per truck mile.??

Transporting chickens in Refridgerated trucks packed in ice cost? I don't know. Western Beef: Some 3,000 truck miles refridgerated costs, Enormous. Potatoes: Southern Ontario, New Brunswick, P. E. I., Manitoba. Cost of transportation, energy consumption. Enormous. People live up here have to pay for all that. Yet it could all be grown here. How about raising Domestic Geese and Ducks. Northern Communities are excellent for that. Importing some corn for feeding Supplement in the winter. Geese and Duck feathers are Excellent fillers for bed comforters. Geese fat is excellent.

fat supplement for Northern living and of course; Geese and Ducks makes excellent feast dinners. Raising Geese and Ducks. Water ponds are needed; there are many here. Also, grass or weeds of any kind; Geese and Ducks will feed on.

HOTHOUSE AND PLASTIC FARM. WHAT IS IT? WHY HERE?

We are buying Tomatoes grown in Mexico; cucumbers, green onions, radishes all grown in Hothouses. Heat is needed to operate the Hothouse up here. Air conditioning is needed in other countries to control Growing temperature; approximately 38°F. Heating Hothouse is less expensive than refridgerating it; besides, heat is a byproduct from steam turbine which we plan to recycle.

Plastic Farm; What Is It?

Plastic domes are in large use all over the world. Plastic Farm is an agricultural field covered with Aluminum Dome Frame which is covered with polyfilm to keep the late frost out, usually the Ground Heat is enough to keep the produce from freezing; if not, Latant Heat is added. (Electric thermostat control) is best. In this area, the last danger of frost is around the first week in June. Thenrthe polyfilm is removed till the early fall frost; if it should happen before

Cont. P. 18

Appendix to page 17

Plastic farming is in a primitive stage at present,

In some countries, acres of srawberries are covered with the polyfilm sheets, to keep the fruit clean from rain and splashing dirt over the fruit,

In this area, to cover potatoes and many other vegetables in the early spring on the open field just over the ground, similar method could be used to keep the crop from freezing.

the produce should ripen, or Second crop is planted.

WHAT IS GROWN ON A PLASTIC FARM?

Early transplant of cabbage, lettuce, stake tomatoes, wax beans, beets, corn, most any vegetables, including Potatoes. All that is left there to ripen for the market or Packing house.

Additional transplants are grown in the hothouse in peat arrangements for Mass Transplanting and growing in the open field. With high water table usually in large areas in the low river flood plains. With double benefits the sun is very hot here for a couple of months. Water table is high in the flood plains. Groundwell irrigation is very beneficial. All this means more local jobs, less energy for transportation purposes. A lot of this could be practised in the Fraserdale-Onakawana area.

Balanced pr- ogram is essential. i.e. There was a Meat packing house here. Large companies pushed them out. There were local Farmers many of them dealing with the packing house and with small stores, they all vanished now.

Green onions, wax beans, carrots, turnips, corn, lettuce, cabbage, and many beautiful green vegetables were available

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at very good prices. At present, they have to be imported from thousands of miles away. At prices that cannot be ignored.

The large Food Chains will not bother with small producer, to reverse this is not going to be easy; but it could be done, it must be done. Food terminals, temperature control, warehousing, all year round. Farmers market would be a good start.

The Economic Block could be Pilot project for many parts in the North.

The Hothouse needs heat. Heat is energy. Energy costs money and diminishing. Some 100,000 people dispose of Enough garbage to generate approximately 2 M.V. Electricity and enough heat to heat 2 large Commercial Hothouses. How much would it cost to buy 2 Megawatts of electricity and how much would it cost to get rid of that much garbage. I haven't got those figures on hand now. My first concern is how to exchange the unwanted material for useful energy essential. Renewable energy and clean at that. Plan to use the Forest waste for the same purpose.

There is a lot of talk about Secondary industry. A lot of public money is given to large manufacturers to modernize, to put man out of work. Some industrial parks are

Purchased with the public money, in awkward places, because it does not suit a potential manufacturer, so there is no industry to utilize it,.

Planring committee must prepare a site for Industrial park, Basic plan and zoning is necessary only, The manufacturers have their own Engineers and Specialists they know better, what and where to invest.

(a good example is Texas Gulf) Then the committee takes stock of the needs in Industry. approach and invite as to needs.

For example; We need a hot house, "Greenhouse" There are Hothouse Companies in Canada, having a hard time, the cost of Transportation renders them incompetitive, approach them, show them the local plan, they may split their operation for local supply only, this area is perfect for such an invitation, they have the know-how, (the hothouse operators) and the management for operating a hothouse. No cost to the local Government or subsidy, Land incentive could be offered and duplication protection, the same for chicken farming and processing, Beef Growing & Slaughter house all for the area consumption first, It has to be a small operation for a start to give the Industry and the public time to adjust.

OTHER INDUSTRY

What is needed locally? No land developers,and retail supers, that is for sure.

Textile Industry

One not too automatic, Work garments, pre-cut fabrics, shipped all over the North where no other industry is practical,small shops,one sewing machine or two in the house, also 10 sewing machine rooms, the customers are here.

This system paid off well some 60 years ago in Europe, So the planning committee has another area to explore for such Industry.

I mentioned in my submission, that immigration from Holland and Mexico may be needed, the reason for that is; Green housing is used there in a large way, Also in some other industries the same thing may be needed, just to get things started....

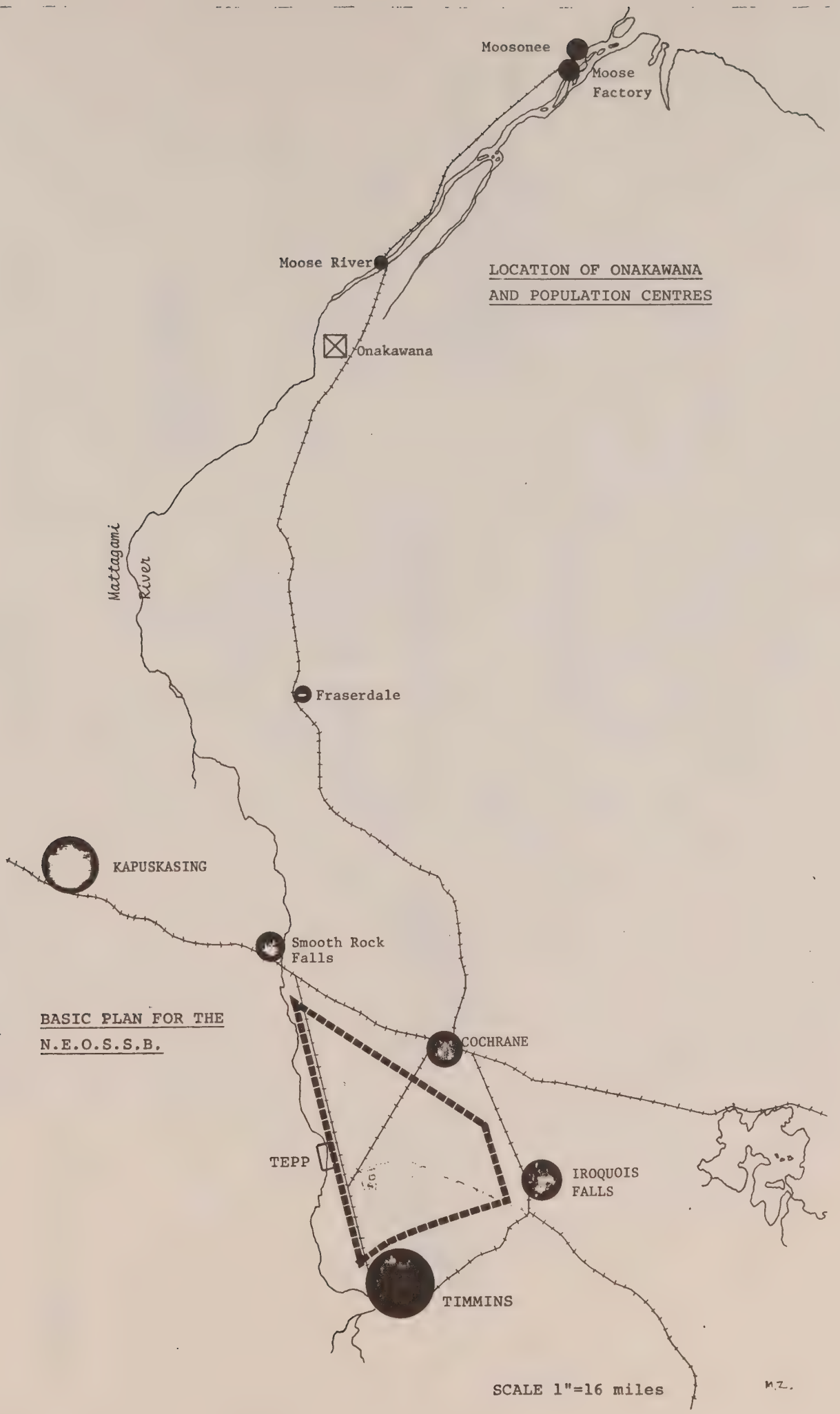
This economic core would provide all the fecillity that the public in this district needs,

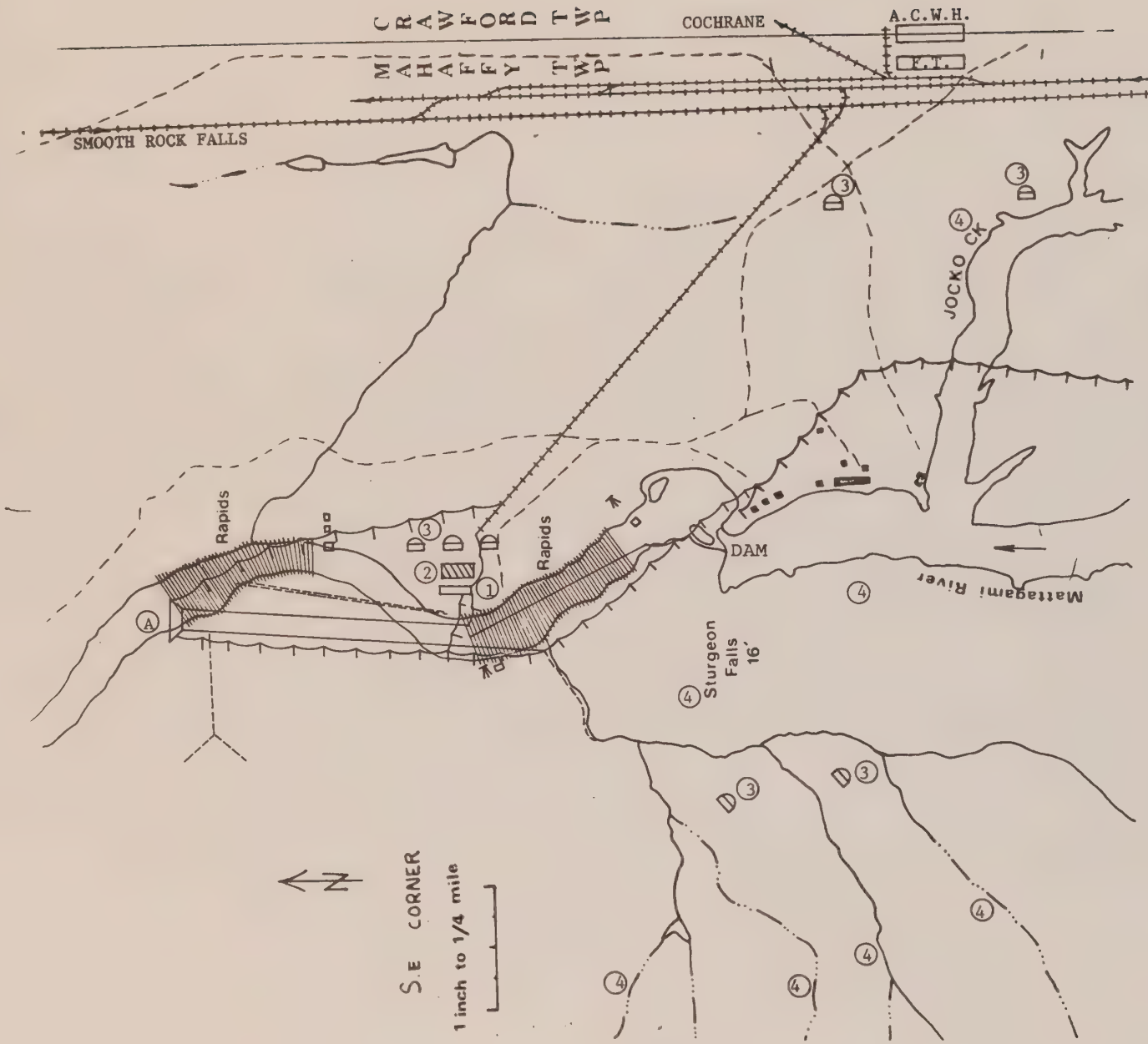
Super rail commutors,(Electric)Super district freight yard,District Hospital, renewable electric power,Atmosphere controlled ware house,district food terminal.

The rail commuters for this economic block are suggested because,(1) the rail is the most efficient load carrier,(2) the rail is the most dependable in this part of the country,even 12" snowfall will not prevent it from moving on the regular routine,and time service,(3) because it could be electrified, of which this part of the country is best suited for renewable energy,in water power,and renewable forest waste and growth.

The rail at #5 is pointing to a suggested super freight yard for the district, where express freight and regular freight train would terminate, Drop and pick up train loads CL.LCL.(Car load and less then car load) trackless cubicals may be a major break through for railways to serve the public (Industry) with fast delivery, conserving energy the economic way,
Factory to customer, warehouse to customer.

Public transportation may be in the same general system, City transports,including airport would meet in that super terminal, going everywhere, and meet everybody.


Moosonee
Moose Factory
Moose River
LOCATION OF ONAKAWANA AND POPULATION CENTRES
Onakawana
Mattagami River
Fraserdale
KAPUSKASING
Smooth Rock Falls
BASIC PLAN FOR THE N.E.O.S.S.B.
COCHRANE
TEPP
IROQUOIS FALLS
TIMMINS
SCALE 1"=16 miles
M.Z.



THE CORE OF THE NORTHERN ECONOMIC BLOCK

A	RAPIDS ELECTRIC GENERATOR
1	FOSSIL POWER PLANT
2	HOT HOUSE
	ELECTRIC TRANSMISSION
3	PLASTIC FARMS
4	SWAMPY LOW AREAS, GOOD SURFACE DRAINAGE. EXCELLENT FOR GREEN VEGETABLE FARMS IRRIGATION FOR SHORT HOT SUMMERS
	RAILWAYS. "ELECTRIC"

ZUDEL

CHAPTER 2

I N S U L A T I O N
M E T H O D S

INSULATION

INSULATION METHODS, COMMERCIAL, DOMESTIC, PITFALLS IN COLD STORAGE AND HUMAN HABITATS

Insulation problems are well known now and have been for many years, in the commercial field. That was one of the most troublesome and expensive single items. In the commercial storage and domestic refrigerators the insulation is well under control, now.

The human habitats and insulation in domestic homes, is a completely new problem, especially since the automatic thermostat got into the picture in the northern region. Replacing window frames, inside walls under the window is a normal thing, taken in stride, as if that just has to be that way. It did not matter very much in the type of buildings that were built here, and the kind of fuel that was used for heating--birch blocks, pine slabs, etc.

Now we are building large, fancy, brick veneer walls, large picture windows, flat roofs, and large air conditioners on the roof tops. Some people are having large and expensive problems. Some of the picture

windows that were there not very long. Stucco walls have to be broken into.

All of the flat roofs are causing expensive problems especially if there is an air conditioning unit on that roof top.

To point out some of the problems I will have to use a question and answer method by describing the problem and suggesting the correct method.

Somewhere, there may be a similar co-incidental printed method. It is not an intentional copy.

Following the Refrigeration Service Engineer Manual I attended many insulation trouble shooting seminars, mixing notes with practical experience. I lived to see 5-10-15 year test projects. Being able to eliminate many small and serious problems in the domestic habitats and commercial buildings is the reason for this book.

M. Zudel

Plate #1 Insulation methods

FRAME WALL & ALUMINUM SIDING, OR ANY OTHER OUTSIDE BOARD FINISH

Two major areas are very important here:

1. Conductivity insulation.
2. Inside pressure proofing. These are both extremely important.

The conductivity sections are at #17 b basement floor and bas. ceiling, #17.15.27.26. 24.4., #9 is a continuous polyfilm pressure proof application glued to seal for pressure leak #24 a. is one piece of glass or rigid plasyglass removable pressure proof insert for the winter months.

Plate #1 FRAME WALL & BRICK VENEER SYSTEM

#15 is a 2 x 6 base plate, sheeting as specified at #11 a. cont. The polyfilm next to it is 1" rigid styrofoam. The brick ties bricks into a tight fit against the styrofoam. The ceiling insulation is as #2 or as a drop ceiling with insulation specified later in this chapter.

SUMMARY ON INSULATION, INSULATION EFFECTS AND LONG RANGE SIDE EFFECTS

This pertains to human comfort, health, conservation, structure and energy.

Insulation is the most misunderstood element, almost to the point of neglect, especially in the northern region. I am only

talking of the things I see and hear.

The following summary is based on facts, documents, physical proof and personal experience.

The basic flow, or heat escape pattern usually results from radiation, conduction and convention, but the two major trouble makers are missing here and usually are not considered important. They are: (a) Atmospheric pressure in the refrigeration and (b) Positive pressure in space heating.

The higher the differential on the separating wall, the higher the heat leak. The importance of the insulation runs in the same manner.

According to the documents already written, i.e., Experience is gained in the refrigeration field. All the above articles are well accepted.

Insulating the frame house and the brick veneer in the northern region is very badly out of insulation line in general. The frame studs gradually become wet by condensation, (due to be a common conductor), between the cold and the warm wall. The bottom plate and the top one are in the same trouble.

The colder the region is, the higher the (K) factor. The insulation between the

studs becomes wet with condensation and loses the insulation effect. This usually happens in the second month of low temperatures when you need it the most. (That is when you do not have it.)

The refrigeration engineers went up to 12" studs with no good insulation results. Now we have 2" in med. temp. walls and 4" in a low temp. wall. In service over the ten years, they show no sign of deterioration. (Please refer to the plate #1 and plate #2 in this brief.)

TROUBLE SHOOTING ON INSULATION BELOW GRADE

There are some claims that insulating below grade all the way down is not necessary.

The following description is an approximate heat loss pattern. This is due to the area and the building material that is used.

The northern Canadian homes are built of:

(1) the main structure is frame, or frame and brick veneer. The basement floor and walls are cement.

The outdoor temperature make up is -10°F to -30°F. The indoor temperature is approximately +70°F to +75°F.

K. Factor for the main structure is .88 to 2.1% -30+70 = 100 T.D.X. 2% K = 200 BTU's heat loss.

The basement walls of cement have a K.F. approximately 22% IDT. 70°F. The ground outside is the bas. cim. walls are -20°F 70 + 20 = 90 x 22 = 1.980 BTU's heat loss through the uninsulated cement walls.

The cement basement floor is: IDT. 70°F. The ground below the floor is approximately +38oF. 70 - 38 = 32 x 22 KF. There is 704 BTU's of heat loss.

Please note: The main structure is losing 200 BTU's. The basement side walls is losing 9.980 BTU's and the basement floor is losing 704 BTU's.

If we are looking at these figures, and the insulatin methods that are used in the north, then we have a lot to change.

Frame construction in the cold region do not have to be much more expensive than it is now. A good method of insulation is the answer.

New houses in the north should change in styles. The basement floor has to be insulated. (This is most important.)

A basement was insulated to the plan on #1 plate. The cost of that job was $2,800.00. If a person cannot afford the cost of that type of insulation, then there is an alternative. The above job includes: 3 partitioned walls, 3 doors and rugs, (which is part of the insulation package.)

Add approximately $3,000.00 for a kitchen and bathroom and $500.00 for a fire escape window and a small dehumidifier. This would make a comfortable apartment for rent, to help pay for the job.

Hundreds of buildings would qualify for this plan. This would include hundreds of people who do not have to invest up to $40,000.00 for a single dwelling.

Insulation programmes are in action now operated by people who do not have much knowledge of insulation. Even if they did, with the present insulation methods, not much energy could be expected to be saved.

Proofs to the last paragraph are available on request.

Notes.

The above figures change: With the outdoors temperature. The further north, then the higher the heat loss. I am concerned, with the further north.

RETROFIT OR NEW

If I insulate the basement and the floor all the way down, will that cause the concrete walls to crack? No!

If the basement cracks, it is the contractor's fault. There are many reasons, for cracked basement walls. The contractors should know them all. (The building inspector should see to it that he does.)

I will mention just a few:

1. The foundation is above frost level.
2. There is uneven original grade.

A rough foundation excavated six inches of power digging holes will do it.

A clay fill and gravel fill, with an uneven base will do it.

Some contractors claim that if the basement wall is insulated, the basement wall will crack. The building heat prevents the walls from cracking. "If that was true, in the north, one would need a lot of heat for that purpose."

The foundation for railway bridges, highway bridges and unheated warehouses, aren't heated but if the above faults exist, they will crack also.

Insulation in the north should be used solely for keeping the heat in.

Perhaps I should start with the insulation retrofit. What is retrofit? A retrofit label is attached to any machine or item that is not done right in the first place.

Insulation in the northern region, should not really be labelled as not being done right in the first place. The northern construction was mostly done by "do it myself."

"I know it's good." There is only one problem about the "I know it's good." It all depends where the person came from and his knowing what is good, especially if one came from England or France or Spain. What is good in those places? It is not necessarily good in Timmins or Cochrane or Moosonee. Better still, if it is good in Toronto or Windsor, it is definitely not good in Timmins, Cochrane and Fraserdale--insulation, that is.

If there is urgency to insulate; "and there is no doubt there is", the north is fairly built up. The trouble is that the contractor will swear that the buildings are insulated and the public will believe that their homes are insulated. The insulation material is in the wall, okay, but sorry to say, it is not sufficient methodically. To insulate after the home has been constructed, it is almost impossible, for many reasons. One main one is displayed on the plate #3 exh. xO. Take a frame building in Timmins or further north--brick veneer or any other type for that matter, when the temperature drops to -30°F with 30 MPH winds. If the inside temperature is at least 70°F and if you had a camera that could make infra-red pictures,

you could make a picture like that inside your front room, your kitchen or any inside wall especially in the corner.

As I mentioned, insulation is practically impossible regardless how much insulation you would add to the ceiling, Drill holes on a side wall. This picture will not change. You can't see the ice by the naked eye, but, you could see some water running down on the outside wall, if the temperature outside gets warmer. (Looking at the outside wall from the inside.) Then you have the window frame and studs on the outside etc. Only new construction methods could change that.

Use new construction methods, unless the building code is legislated or somehow people of the north look into that seriously. The retrofit insulation is rather a waste of money.

The insulating material on the plate #3 is not on the market as yet. The method is not permissable for reproduction without consent. The material is made of high density styrofoam 5/8" x 3/8" giprock coat, sealed by liquid polyfilm and pressure proof paint.

The application of this material would be pasted on all outside walls, plus, if a

petition for the inside is needed. Turn the corner 18" on the inside wall, to prevent convection from the warm wall.

To promise how much saving there will be, it is hard to say because this method has never been used on the residential buildings. In the refrigerated cold rooms it has done beautiful results. One thing we do know now, that there will not be any rotten window frames or inside walls. The energy saved in the well-insulated walk in coolers and freezers are in the one hundred and over mark.

Well planned residential construction should not be any different. There is more about insulation. Not that this volume could stand the space but construction methods of insulation methods have been pretty well covered.

The health of the tenants in the long and cold region should be looked into next. The humidity should be uniformly controlled if possible, and not less than 35% if possible. This will come up again in this volume.

A heating system should also be changed. A warm air furnace should be in the middle of the building. Large plenums and warm air defusers should be large and bonnets should be streamlined. Round corners would increase gravity circulation. Warm plenums should be

short as possible and coming out at the middle of the building rather than on the cold wall.

This has nothing to do with insulation, just that air conditioning also needs some changes in the north.

For example: Heat is not running from hot to hot. If the bonnet is square, heat builds up in the corners. The latent heat running through the heat exchanger, has less chance to throw off heat, if the temperature is hot on both sides. The result is that more heat is going into the chimney--more so if the heating unit is sitting on the roof top at -30°F.

INSULATION RETROFIT

Retrofitting the present existing homes are essential in the northern region. Long winters and low temperatures will drain the national energy.

We have to be careful not to spend a great deal of tax dollars without benefitting someone.

To retro-insulate the main structure, two points must be respected. (1) Conductivity must be insulated (2) Inside walls must be pressure proofed. Pressure proof the inside window insert. Please refer to plate #1, detail 24 a. and 1 a. exh. ox.

Only one item remains now--the double trouble, HUMIDITY. It effects people, seriously. It effects the structure seriously. It also effects the heat bill seriously.

Controlled humidity?
What level of humidity?

Personally, I got into serious trouble for following this setting.

Whoever recommended this setting should look at it again.

-20°F	15%
-10°F	20%
0°F	25%
10°F	30%
20°F	35%
above	40%

CONTROLLED

Controlled humidity has a big role to play. As I mentioned above, it does save energy by keeping the structural capillaries even and closed, by achieving human comfort at lower temperature levels.

Some professionals look at humidity as an undesirable element. Some MD's do not believe in it. Other MD's suggest 50% of it. Personally I had a hard experience for lack of it.

By living 45 years in the north, I found out the hard way that insulation is a serious business.

Heating, air conditioning and humidity in the north is more than just to making it warm or cool. There are considerable side effects.

The north is populating fast. If the air conditioning is not taken seriously, then the cost of medicine, energy and fire insurance will cost much more than a revised building code and much more than public education geared to the northern living.

WHAT HAS HUMIDITY TO DO WITH THE BUILDING STRUCTURE?

If the building material is porous, plaster, wood, water paint etc., then the humidity plays a part here. If the inside of the house is left to dehydrate, the building capillaries become enlarged. If the temperature outside is below freezing then the humidity in the house gets high and hot, (as sometimes it does.) The positive inside pressure fills the capillaries, condenses and freezes in there. The window frame will receive the most extensive rot damage by that fact.

HUMIDITY VERSUS PEOPLE

For practical reasons, to understand the humidity is essential in the cold region. Regarding insulating human habitats, the insulation must be understood. The two elements should not be separated.

The following article is a common yardstick. The outside temperature is taken at $0^{o}F$ with a

25% inside relative humidity, just to understand the mechanics of it.

Let's take a look in the meantime at the 25%, relative humidity figures above. If air is heated from 0°F to 70°F, then 3 3/4 pints of water have to be added to give the same relative humidity of 25%.

If air is heated from 31° to 70° then 3 pints of water have to be added. If this water is not added, then down goes the relative humidity. For example: If we bring into our homes, air at 31° with 25% humidity, (its moisture content is one pint) and heat that air to 70°F then the relative humidity goes down to 6¼%. (Moisture content still being one pint.)

We know now a little of what the relative humidity and the outdoor temperature is all about.

We must understand that if we have a minus 30°F outdoor temperature and we bring the air in at that 30°F, heat the same to 70°F then we are running out of figures and running into trouble.

At those conditions, if water is not added to the home, the nose and throat membranes will dry out, crack and bleed. In some cases, sleeping is hard, especially past

midnight. Breathing is hard and depressing, more so at an older age.

Those symptoms are not for lack of air, it is lack of moisture in the air; (Humidity) that is causing that problem. A much more understanding is needed by the public education, schools, etc.

Only the part of humidity that is brought up here has a direct relaxation with insulating in the domestic field.

First we should know the fact about matters. In the hot temperatures practically all man-made materials will expand. In the cold temperature, materials will shrink. The roofing material is no exception.

What does the water do to the roof in the winter? Since the water in the fall does not evaporate from the sun, radiation builds up. In the fall, wet snow will add more water to the roofing material. It all gets water-logged. Then comes the frost, especially if the drain gets blocked, water builds up. Up comes the heavy deep frost. The water and the wet snow freezes solid and the roofing water and the snow becomes a solid mass of ice.

Then the low temperature dehydrates the ice and the roofing. The shrinking process takes place. The frost gets lower and things

start to crack. The ice will shrink leaving cracks in the ice as much as one-eighths of an inch, but it does not stop there. The roofing material cracks too. It leaves a surface like a loose jigsaw puzzle. Then comes a thaw and the ice melts. It starts from the bottom first. Normally we will get a pot or a water pail to catch the drops or thin leaks. Warm weather comes bringing rain, on our now leaky roof. If you know where the problem is, you will buy a few galoons of roof coating, fill up the cracks, and you will be Okay; till the next winter, BUT IF YOU HAVE GRAVEL ON YOUR ROOF, you can not even do that. (Fill in the cracks) Then comes the contractor making a new roof while we sweat to pay the bill.

Do we need a course on how to survive in the Arctic or should we wait till someone from somewhere comes to do something for us?
Mr. Meek:

"Does the snow melt on your roof?"
Mr. Zudel:

"I have had six different roofs of my own, dating back 43 years for the first one with each one after that an improvement to the last."

The two main proverbs of a trouble shooter:

1. Why has this happened?
2. What do we do so this will not happen again?
1. Have a peak type of roof.
2. Use a flat asphalt hot pitch tar
3. Use a 2 x 10" Cathedral roof and Ceiling combination
4. Use a cheap 2 x 4 plus 3/4" shiplap and tar paper. The roof should have a 1 - 12" slope. (See exh. 1, 2, and 3.)

All four types are on a 30' x 90' flats above a store building. Then there are two more types: low peak and peak and dormers which are trouble makers.

The fancy built-up insulated one is the most expensive one and the most trouble maker in the cold region, so I will try to point out the problem and the cure that has transpired in the last 43 years on the same building in the same region.

Fig.#1

Is the flat built up that it cannot be insulated? One of the most expensive single items is the water. The contractors seem to have a delight to build a roof that can hold water. They put loads of gravel up there to keep the roof cool on a hot day. What this water and gravel does to the roof no one seems to care. What I am again

mentioning is that water and gravel may be doing some good in the hot regions but what is it doing in the north?

Fig.#2

This method has been in service over 20 years. The insulation is good with no frost problems except the roofing tar paper bulges up in the 90°F and shrinks and cracks in the -30°F. frost. Metal roofing is contemplated as in the Fig. #3 to overcome that.

Fig. #3

Is renovating the #2 method. This system is adaptable for Concrete and Steel construction. The main feature here is the insulable drop ceiling which completely eliminates the need of the troublesome flat roof especially in the north.

CONSTRUCTION

INSULATING AND HUMIDITY IN THE FAR NORTH

In Kashechewan, there was a federal construction of housing for the northern habitation. That didn't please the Native population very much. The cost and the homes did not stand up to the northern atmosphere. (The Chief declared.)

Money was spent in the millions in which most of it was a helicopter commuting and freight shipping. To give the northerners

help, it should be in a different way. To build a house to stand up to low temperatures is again another ball game.

Building on a perma frost is another tricky business. The building has to be planned so it can heave, sink or tilt. Also, the insulation must be carefully applied. If any heat is to be used in the building, more so.

I have suggested that the construction of a prototype building be administered at the Northern College in Timmins and some of the northern universities.

Bring some of the native men to the college and teach them to build their own homes. Some small saw mills could be erected on the spot or near the settlement. Lumber could also be brought in by waterways in the summer. Saw dust is excellent insulation material. Saw dust could also be used in wooden sheds to cover ice for drinking water.

There is many a way to alleviate the hardship and create employment for self-preservation, which must be a large part of future living anywhere. "Humidity in the North." I don't know. All I know is that humidity in a deep freeze is not existing. No one lives in those things. If heat is to be kept in the buildings up there, the

problem will show itself and then it has to be dealt with but the building design should be such that it could cope with some level of humidity.

Some of the insulation questions were presented to me at the Royal Commission on Electric Power Planning by:

1. Dr. Stevenson: Insulation Factors: Are K Factors known as R Factors?"
2. Mr. Hume: "On the question of insulation in the Timmins area, is there any code, Mandatory Code, for insulation standards?"
3. Mr. Hume: "Am I allowed to build a home in Timmins without any insulation at all?"
4. Mr. Meek: "Have you added insulation to your own house and then compared the fuel bill before and after for two successive years?"
5. Dr. Porter: "($18.00 for Gas and $22.00 for electricity) Are these for the peak months for January ?"
6. Dr. Porter: "Wouldn't the local humidifiers, the small units, placed in specific rooms, for instance, help?"
7. Dr. Stevenson: "There are two questions on humidity settings on page 702."
8. Mr. Meek: "What I was trying to get at is, you spent so much money insulating your house and what I wanted to know is: How much did you actually save on your fuel bill for the first year, for instance, in money, in total?"

9. Dr. Stevenson: "Where did the 12 gallons of water go?"

   i You don't like the humidity settings that are down here?

   ii Do these come from the "Keeping the Heat In" booklet or something like that?"

10. Mr. Meek: "You are using 12 gallons of water, 3 layers of glass and this window no longer frosts up? Do you still have to use 12 gallons of water a day?"

11. Mr. Meek: "Your actual house is an old house that you have reinsulated or added to? Do your studs still carry heat directly outside or did you manage to stop it?"

12. Mr. Meek: "What I am trying to get at is: You bought an old house and you insulated it to the best you can. Do you feel you have done the best insulation that is practical now with the house?"

13. Mr. Meek: "You can't do much more or expect more?"

14. Mr. Meek: "One of the speakers here suggested that it would be a good idea to have shutters on the windows at night. He suggested shutters with R-15 which you could close over the window at night. Do you have anything equivalent to that?"

15. Mr. Meek: "No, I meant for the furnace. You have a gas furnace and each cubic of gas requires so many cubic feet of air. I wondered: Are you drawing that from the house or is that from the outside?

16. Mr. Meek: "Or do you have a separate inlet down in the cellar which is highly recommended by some people?"

17. Mr. Meek: "Have there been, in your area, any houses built from the start using your suggestion or any other fuel saving or insulation methods?"

18. Mr. Meek: "Is he using less fuel than expected?"

19. Mr. Meek: "You would use your basement for living or just recreational purposes? Keep your basement up to 72, that is what I am getting at."

20. Mr. Meek: "In the winter does the snow melt on your roof or slide off?"

21. Dr. Stevenson: "Just on that, Mr. Zudel, I noticed you say we should insulate the basement floor, which is a recommendation I don't very often see unless it is on a grade. If your basement floor slab was below frost line, there wouldn't be much to be gained by insulating below the slab, would there?"

Refer to page . Since that statement is very directly affecting insulation business in the north, some of it is answered on pages and the same claim is strongly rejected by the National Reserach Council in Ottawa. Therefore; the need of building proto-type units in the north is needed for further experimentation. Basements can be insulated, have to be insulated and the northerners should strive very hard to see that they are insulated."

22. Dr. Stevenson: "It's again a question Timmins versus Toronto."

23. Mr. Zudel: "I was talking about the northern area."

Mr. Stevenson: "That's right."

24. Dr. Porter: "There's quite a grade between the floor and the temperature of the earth in the near vicinity."

COMMENTS

All those questions are directed to the insulation concept, except the General Public cannot derive any benefits from them because the Contractor is using his own insulation methods. Some contractors, even if they know better methods, the competition for price prevents or prohibits them to use more expensive methods because in the North there is no mandatory code for insulation methods.

My answers for the questions were some 20 pages. To talk about them is practically useless. They are serious questions. We know all the answers, (practically all). Unless the Universities and Colleges will help to print a supplement to the Mandatory Building Code of Insulation. Actual samples should be built here to use methods we know and further document same. Nothing more could be expected from the large or small contractor. At present, the buildings that are going up now,

large or small, the insulation in them is not fit for the cold region.

To answer some of the many questions I have chosen; are relative to Insulation in the North; #6, Dr. Porter; #7, Dr. Stevenson; #10 Mr. Meek; #17 Mr. Meek; #18 Mr. Meek; #19 Mr. Meek; #20 Dr. Stevenson; #21 Dr. Stevenson; and #23 Dr. Porter:

#7 Dr. Stevenson: Humidity settings. Dr. Stevenson is using the "Keep The Heat In" booklet for reference for the recommended Humidity settings: refer to #9.

I am using Refrigeration Service Engineers Society official journal and personal experience as a result of Insulation plus or minus humidity.

I also have to use people and structural deficiency to point out the results of long range, serious effects in both cases.

To deal with the side effects of insulation factors and structural side effects, I would like to use question #1 by Dr. Stevenson. "Are K factors known as R factors?"

As I know them they are two different factors in the same field. R factors is a method used by manufacturer's Engineers to measure resistance of heat movement through the insulation material in the laboratory, where humidity is normal the temperature is controlled.

K factor is a building Engineer's method of declaring the insulation effect on a completed skin of the structure, using insulated dry bulb on the inside skin of a cold wall vs wet bulb of the ambient temperature in the building, also the same method used on the outside wall, the different temperature of the bulbs is the K factor.

For example: A construction situation where the insulation will definitely fail. A building starts in September, the nights are cool but rains frequently, the humidity is high, the lumber is green, the cement walls are poured and tar painted on the outside. The building progressing and ready to insulate R.12 and R.22 is used; inside and outside skin is finished comes January and minus 20°F temperature if the wet and dry bulb test is taken on the wall that is filled with the R.22 insulation one would be lucky to get R.4 reading approximately 22K factor.

Another BTU hog is our Residential heating system, the chimney is taking out 25 - 30% of the heating input.

That also needs a good look at.

THE CASES ARE TRUE - NAMES WITHHELD

CASE #1

(1) A Toronto Girl, (2) "I" Insulation trouble shooting (3) Two medical doctors plus specialists.

PLACE: TIMMINS, ONTARIO

1971 The house is insulated to the average northern methods used at that time. A natural gas furnace was used for heating prior to that date. The gas furnace was an oversize of approximately 20%. There was a large heat exchanger and a slow velocity blower. The thermostat was set to a short cycle. A humidifier was used, (evaporative) was in the furnace bonnet. Humidity in the house was low, but not known.

In the middle of January, the lady of the house weakens. By the end of January, she has a hard time to get out of bed.

By the middle of March, relative humidity rises to 34 - 45%. The lady starts to walk, eat, and work. All that time, a doctor's house calls were frequently made out but medication was not effective, etc.

In the fall of 1971, a new Gas Furnace was installed. (Only Licenced Technicians are allowed to handle natural gas equipment.)

The new furnace is a smaller size with a double baffle in the heat exchanger. There is a high bonnet temperature and a high speed blower. A ¼ HP motor blows a 15 amp fuse, sometimes a 20 amp blows.

Then comes the middle of January and the same lady gets very ill. She falls into bed. The Medical team gets back to work but is no help. She survives the winter.

One year later, in the winter, cold temperatures set in. By Christmas time, the lady is really very sick and she does not eat anymore.

I told the medical doctors that the new furnace--a lack of humidity is causing the trouble. The reply was, "Humidity has nothing to do with her problem. At her age nothing can be done."

Christmas Day-1973:

I knew a hardware store dealer so I asked him for a favour to sell me a rotary humidifier, an electric glass heat and a couple of plug-in portable electric heaters.

Then I shut off the gas furnace and used the electric heat. I used 12 gallons of water per day for a week. It brought up the humidity to 55% in a week's time. The lady started to eat, even walk a block a day. After one month, she was completely recovered without the medical aid.

The humidity stays at a minimum of 35% to a maximum of 55%.

CASE #2

A basement was insulated almost to the suggested insulation methods in this booklet.

One winter has gone without any comments or complaints. I was waiting, but it did not happen until the next winter. There was more headaches than usual and persistant coughing was getting worse as time went on.

The matter was brought to the Council including myself. An expert was called prior to the council meeting. He suggested to install a cold air intake for the furnace combustion. That's where the trouble was supposed to be.

Also, funds were set aside for a larger humidifier. Also, the cold air intake was suggested.

I volunteered my services to trouble shoot the problem.

With the permission of the family, I set up some instruments to find the humidity level. I found it to be 17% in the basement, 21% on the main floor and 22% on the second floor.

There was a squirrel cage humidifier, but not used because there was ice on the window. (Also, another expert suggested ice on the windows was a cause of too much humidity in the house.)

After two days of testing, I suggested to start the humidifier to reach 35 - 55% humidity regardless of ice on the window, or the experts advice. The whole winter went and the family felt fine.

The occupant of the house was a professional B.S.M.E. and B.S.D. I asked the man: "Would he give evidence to this case if needed." He certainly would.

This family is happy now not bothering the experts or the MD's.

Insulation and controlled humidity won this case also. That is a hard way to settle individual cases for lack of humidity trauma. Would it not be faster and cheaper to educate the experts first, then the general public?

It is not my intention to clutter this volume with technical details, that should come up in the college.

I am trying to point out, insulation and humidity should not be separated in the living habitats of the north.

INSULATION AND VENTILATION

The Domestic Area What is the insulation good for if the residential homes are equipped with: a fire place, kitchen exhaust hood, bathroom exhaust fans etc. All those features are good up to a point, but to conserve energy all those features will have to go back to the drawing board.

Ventilating the whole house needs to be re-evaluated.

Self-preservation is everybody's business. The government can only apply rules and regulations, the real conservation has to lie on each individual's back.

It really doesn't matter how we look at it. The energy belongs to the public. No one individual should have the right to abuse or to waste it.

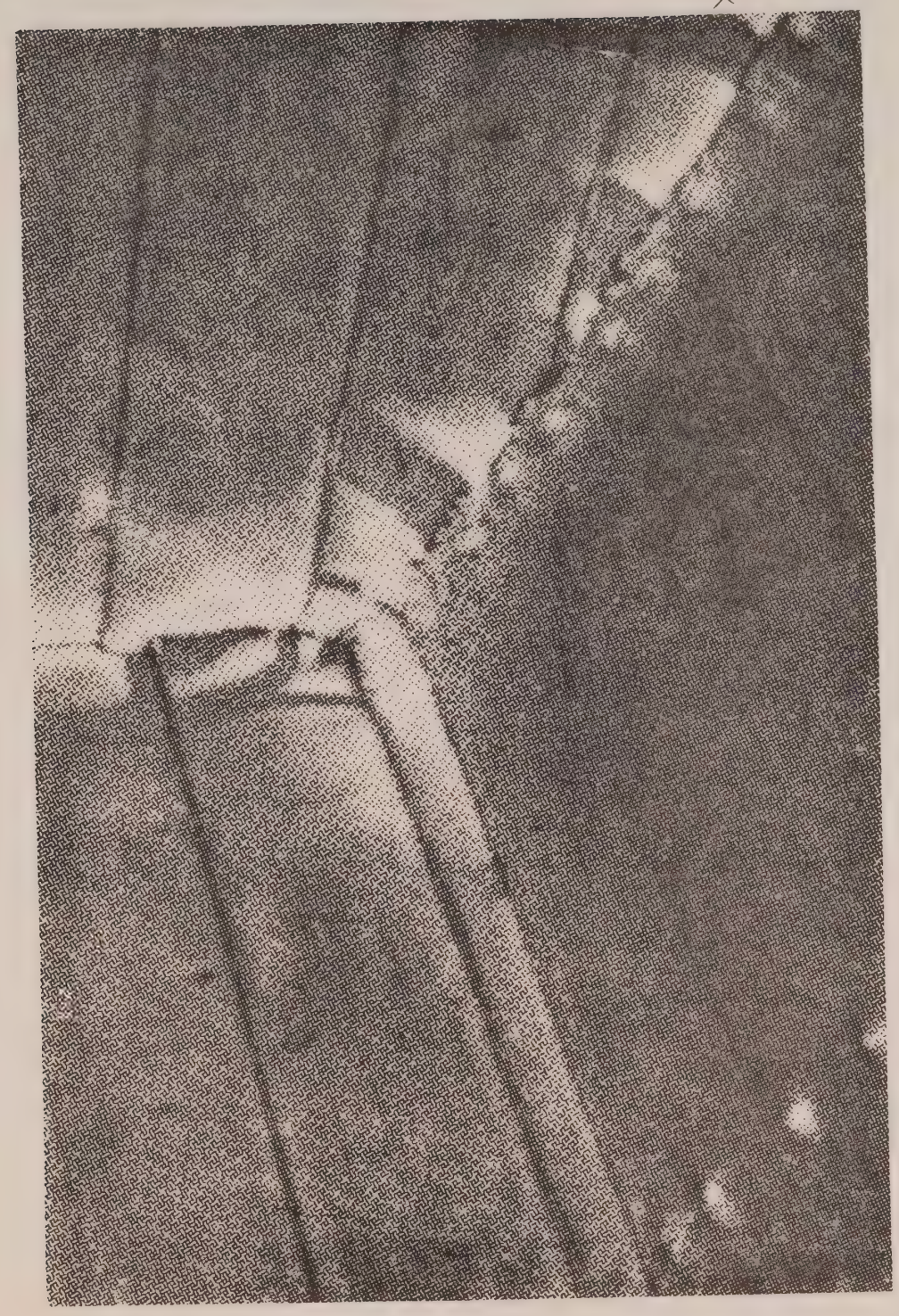
The future world will have to be built to the share and share alike system. When one uses his or her share, one will have to wait for the next time around. Depend on one's own reserve.

The public transportation in the north is a very serious business. A private automobile, large or small, has no place for private transportation, to a place of work where a large number of workers commute daily back and forth. Public transportation should be provided.

The public transportation must be well organized. Union terminals are a connection of all routes. Union terminals should be provided with rest rooms, restaurants, etc.

The north should resort to railways, maintenance, economy, dependability, snow plowing, salting etc.

0X 32



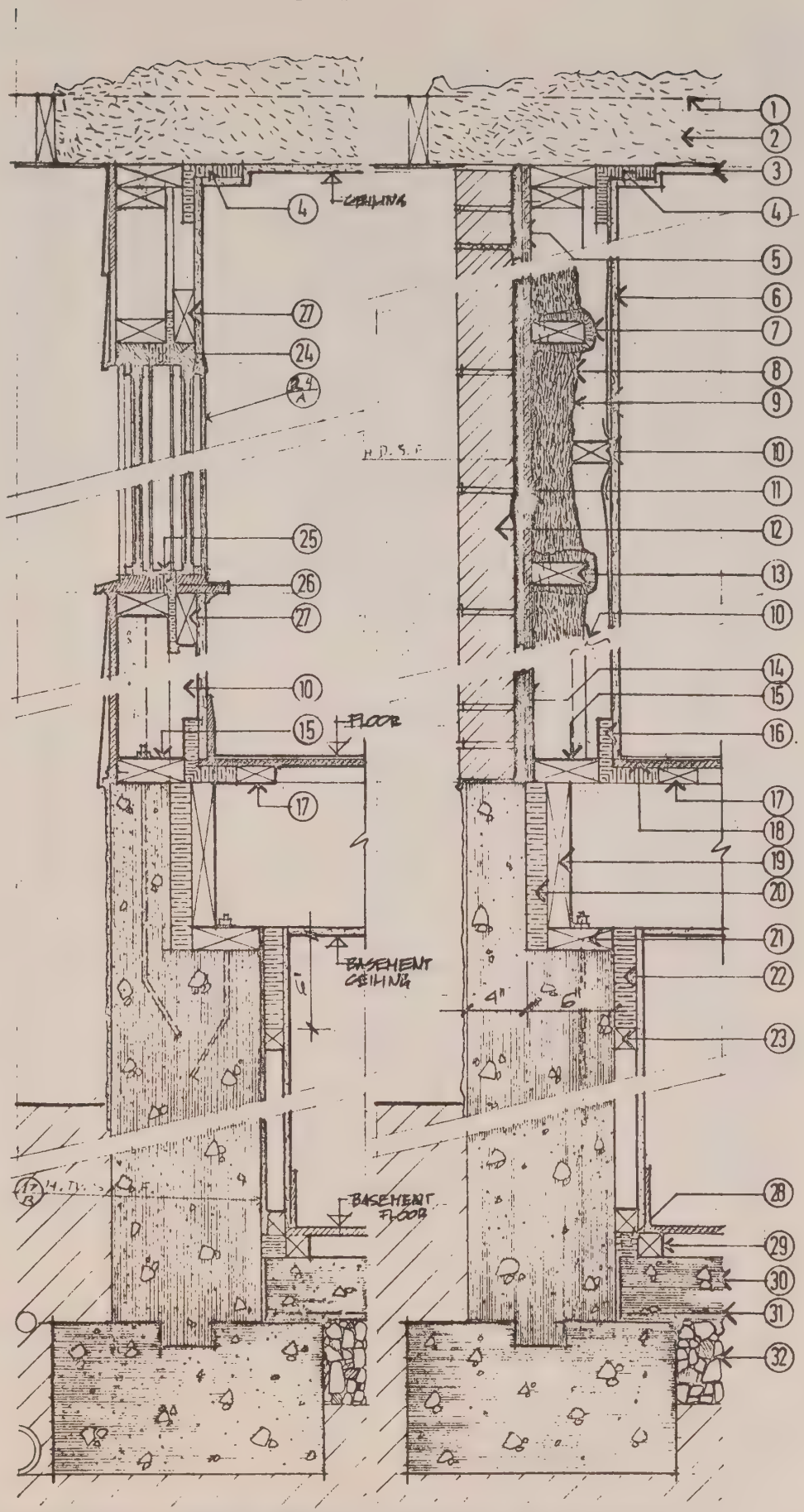
(1) WOOD ROOF TRUSSES AS SPECIFIED
(2) LOOSE FILL INSULATION
(3) DRYWALL CEILING OVER CONINUOUS VAPOUR BARRIER
(4) 4"x4"x1" STYRENE FOAM CONTINUOUS L-SHAPED INSULATION
(5) METAL BRICK TIES AS SPECIFIED
(6) INTERIOR DRYWALL
(7) FIBERGLASS 1" PADS STAPLED TO STUDS
(8) 5½" FRICTION FIBERGLAS INSULATION
(9) CONTINUOUS OVERLAPPED VAPOUR BARRIER GLUED /NOT STAPPLED/
(10) 2"X3" INTERIOR STUDS
(11) SHEATING AS SPECIFIED
(12) BRICK VENEER AS SPECIFIED
(13) STANDARD 2"x4" WOOD STUD
(14) METAL FLASHING
(15) 2"X6" BASE PLATE
(16) 4"x4"x1" STYRENE FOAM CONT. L-SHAPED INSULATION
(17) 2"x4" WOOD SLEEPERS 17-R. 1" STYRENE FOAM
(18) SUBFLOOR AS SPECIFIED
(19) 2"x10" HEADER /OR AS SPECIFIED/
(20) 1½" STYRENE FOAM INSULATION
(21) 2"x5" BASE PLATE ANCHORED TO CONCRETE FOUNDATION WALL
(22) 1½" STYRENE FOAM INSULATION
(23) 2"x2" WOOD STRAPPING
(24) DIVIDED WOOD WINDOW FRAME (24A) REMOVABLE (INSIDE) PA. PRF. STORM INSERT
(25) ¼" PLYWOOD COVER INSIDE WINDOW OPENING
(26) STYRENE FOAM INSULATION BETWEEN WINDOW FRAMES AROUND.
(27) 2"x4" ROUGH OPENING FRAMING
(28) STYRENE FOAM INSULATION
(29) 2"x2" SLEEPERS
(30) 4" CONCRETE SLAB
(31) 6'x6" W.M. REINFORCING
(32) 6" CRUSHED STONE
(X) Extremely low temperature areas are considered, between, -10° c. and -40° c. temperature.

If 8" Cement base wall is used, use 1"X 10" Header plus 2X10" spreaders, between the floor joists, and 1" high density Styrofoam.

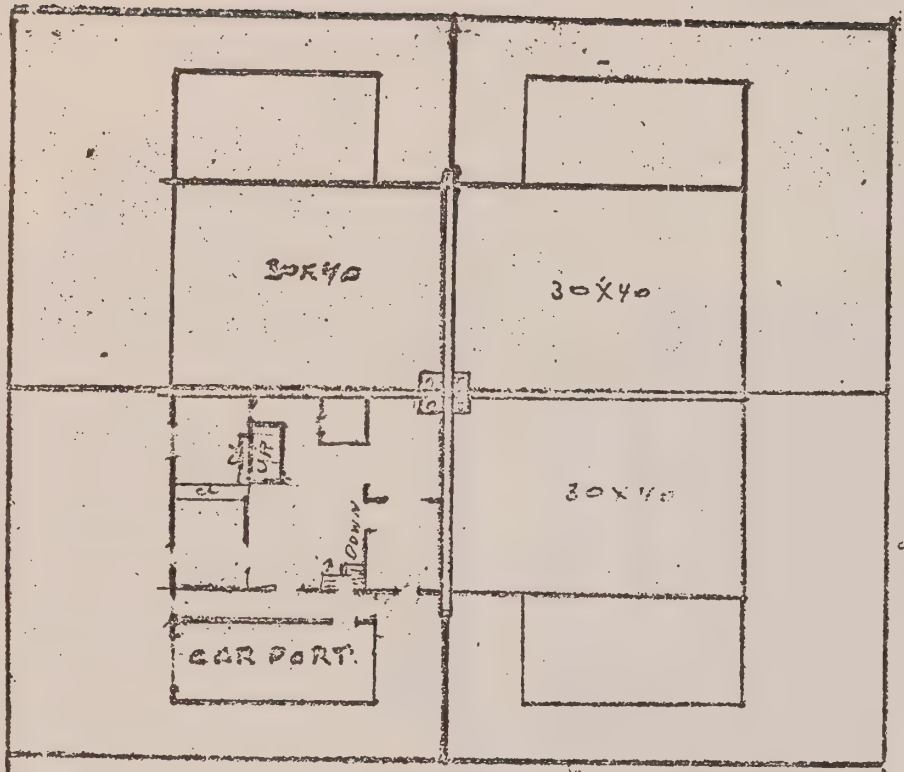
Brick veneer wall: o.s.b. sheeting, 6.m. polyfilm, metal brick ties, 1" shiplap STYRENE FOAM joint tight fit, no paste no nails nospace, no vents, window and door frames solid caulking all around the brick wall. Ceiling Insulation: If loose insulation is used cover 2" over the wood joists, or wrap and staple one or 2" vapour back pads over the joists, and fill not less then 7" insulation in between the joists.

This suggestion applies to cold walls only, basement walls and floors are considered as cold walls.

CONSTRUCTION DETAILS FOR EXTREMLY LOW TEMPERATURE AREAS
RESIDENTIAL HOUSING AS SUGGESTED BY Mr M ZUBEL TIMMINS



CONSTRUCTION DETAILS FOR EXTREMLY LOW TEMPERATURE AREAS
RESIDENTIAL HOUSING AS SUGGESTED BY Mr. M. ZUDEL, TIMMINS



ZUDEL.

RANCH HOUSES SHOULDBE DISCOURAGED IN THE NORTHERN REGION.

THIS PLAN SUGGESTS 4 PLEXS. ON 4 LOTS. ELIMINATE 8 COLD WALLS. NEW TYPE WINDOWS. NEW TYPE INSULATION AND METHOD FOR THE COLD WALLS.

4 PRIVATE HOMES.

4 Private Owners, Owner's cost equals 70%.

STREET

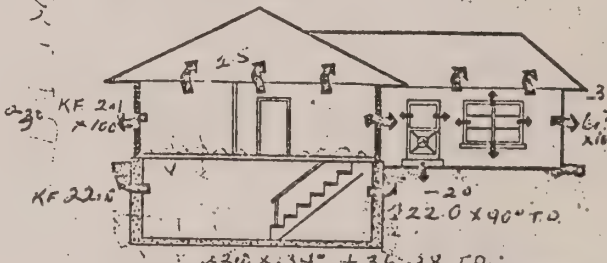
#7

Ranch House.

save energy because you use less fuel for heating. Secondly, you feel warmer and more comfortable.

Savings

From the moment heat is generated, it tries to escape into the colder air outside. It vanishes through the ceiling walls, sneaks out around windows and doors. The rate of escape depends on the difference between the inside and outside temperatures, and on the resistance it meets. Insulation is the key barrier that traps and holds heat inside.



A thorough re-insulation job can cut your annual heating bill by as much as 50 per cent. A more modest improvement to your insulation can save you 20 to 30 per cent annually. So if your bill is now $300, a 30 per cent saving could reduce it to $210. The cost of insulating all or part of a house is usually paid for in 5 years or less, through lower annual heating costs.

A quick way to find out if your house needs extra insulation is to take a look outside. On a dull day, is the snow melting on the roof? If so, you don't have enough insulation in the attic. Is snow disappearing from around the sides of the house? If so you need insulation on the basement walls.

46 / Timmins; Land cost, Construction cost of a Ranch House, Insulation cost, Heating-cost, Frontage cost, Snow clearing cost, Equals 100 %, one private home one owner.

JUSTA THEORY IN NOTACTS

DROP CEILING AND ROOF COMBINATION - INSULATIO
15 YEAR TEST

Good anywhere a special feature for the cold climate.

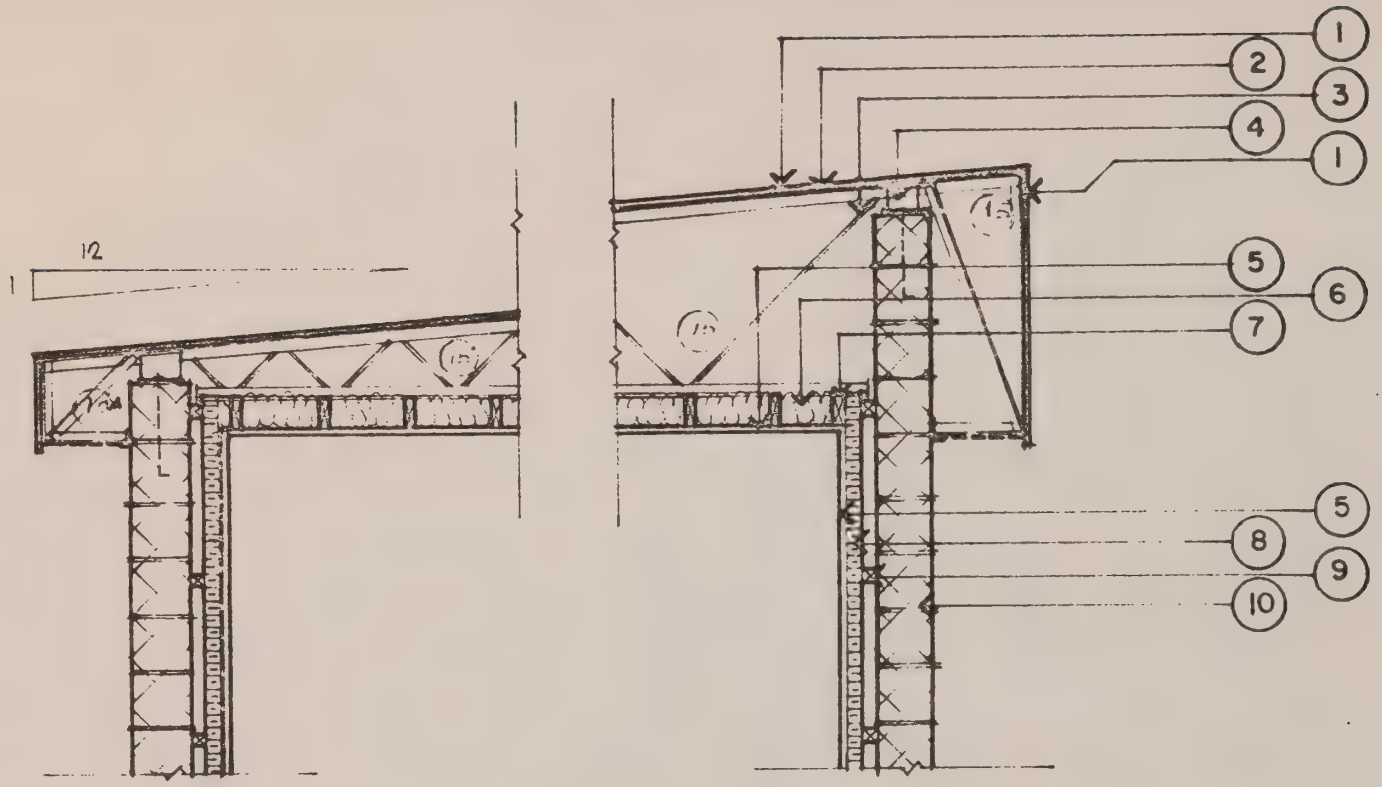
1. Metal roofing water proof sealed by tar or solder, expension joints for the hot and cold temperature,

15. Loose but water proof ventilation,

15a. If controlled drainage is necessary use that area, soldered drainage with a heating cable is recommended.

Special care should be practiced that no tall box arrangements like: "Roof top heatin units, roof top Air condensers" those units and large snow drifts are very serious trouble makers.

Top floor or basement compartments are best for all that equipment in the North.



1 — METAL ROOFING
2 — PLYWOOD
3 — METAL JOIST
4 — METAL SHOE
5 — DRYWALL OVER 6 MIL. POLY FILM
6 — LOOSE INSULATION
7 — 2"x4" RAFTERS
8 — 2" STYROFOAM
9 — 2"x2" SEPARATORS
10 — 8" CONCRETE BLOCK
11 —
12 —
13 —
14 —
15 —
◯ —

BY MIKE ZUDEL

CHAPTER 3

CONSERVING ENERGY BY SYSTEMATIC CONTROL BY THE SUPPLIER

CONSERVING ENERGY

NEWSPAPERS, RADIOS, TELEVISION AND BILLBOARDS are very expensive ways to control energy by asking people to do so.

This method only works when there is no money in the pocket or when a disaster nulifies the availability of any form of energy.

ELECTRIC POWER BREAKDOWN IS THE WORST KIND of a disaster ever known. In the United States years ago, the St. Lawrence River froze early, causing a shortage of oil for heating. The General Public went for electricity to heat the space but overloaded the electric system. The electric system is such that it cannot defend itself, so everything burns --fuses, transmissions and tops of electric poles. The whole system then dies. People froze, hands and feet froze and freezers went soft. Anything that moved by electricity stopped. If you do have furnace oil in your storage tank, the electric control stops it. The same thing happens with a natural gas furnace which is controlled by electricity.

Now there is a problem on the highways--shortage of gasoline. Some

motorists have to wait for hours to get 3 gallons of gasoline.

Northern Ontario: We did not have any major electrical problem. A couple of years ago there were some brownouts but what would it be like if we did have an electrical break for whatever the reason may be?

The time is ripe for individuals to look into their own reserves for emergency. Later in this booklet there will be a page of suggestions telling you what you can do for yourself. There is also a problem that any individual just cannot do anything about. There is also a suggestion what the public utilities should be preparing for.

Before the electricity came to the north, the public used to take care of itself for heat, cooking and light. This is in the public official's hands now and safety standards in the north are not quite in order, as far as the heating is concerned which is one of the most important elements for safety of life.

This is not written for someone to be offended by. There is hope that the general public with the help of the educators will check and convince the

Legislators to implement more safety heating standards and electrical controls.

The following excerpts are from some of my submissions that were presented to the Porter's Commission, when the Arab's oil boycott appeared on the public media and the Minister of Energy was busy writing to the Municipalities to conserve the energy, etc.

(1) I tried to talk to some of the local authorities and local college representatives; to at least inform the general public of the danger that the brownouts, or worse still, the blackouts, if they should occur.

(2) Dec. 1976: Today the T.V. report was; "The temperature is 37°C." The reporter goes on about the Ontario Hydro not being able to supply the electric power. The temperature drops here to 40°C plus wind factor. Power failure at that temperature???

(3) People here heat with oil and natural gas. Some with electricity because all of the heating systems are

CONTROLLED by electricity. If the electricity stops; everything stops.

(4) The Energy Minister is a very busy man these days.

He is asking municipalities to conserve energy by mail. I was at one council meeting once where one of those letters was read. It took 15 seconds to deliberate the issue, (no comments, no questions, the matter is closed.) How much then, could be expected from the general public to voluntarily conserve anything?

(5) The Minister suggests and asks the general public to conserve electric power between 4:00 p.m. and 7:00 p.m.

How could it be done?

Let us look into a trouble shooting test. Why 4:00 p.m. to 7:00 p.m.? What is going on at that time? The electric demand at that time is the highest, (sometimes dangerously high). Electric power is borrowed for that period.

(6) This is at winter time - 4:00 p.m. Children are coming home from

school, frequently opening the door. (The thermostat turns on the electric heat and the electric range is turned on to prepare the dinner. It is dark. The lights are turned on all over the house. The man comes home from work and plugs in the car, the dishwasher and the snow blower and so on. (Does any one in that house ever think that any one of those electric fixtures could blow the national fuse?)

Why should they worry about that? In the first place, they don't understand: in the second place, the system needs reconstruction.

Future Planning: The people in this northern area better look very seriously into energy reserves, dependability, continuity and back-up spares, i.e., We use candles, if the electric light goes off or wood or coal, if the heat goes off.

(7) There is microgenerating control system that does not depend on electricity for gas and oil heating but the public does not know that. The contractor does not care who is responsible for public welfare. It is certainly hard

to say.

Certainly our local public officials do not worry about that. Maybe they don't even know that problem exists.

Conserving energy sometimes is impossible. The house, the machine and the transportation has to be designed for energy efficiency. The machine, for example is the automobile. The life of a poor manufacture is short. It only takes a few years to find out which it is. The change is the resulting factor.

The house, in this area is a different story. The first few years are the worst for cost of heat but there isn't very much the owner can do. The building code should really be changed very much so in the north.

Conserving energy in transportation: What can an individual do in that field? The job is some 30 miles from his home. The only way a man can get there is by an automobile, sometimes bumper to bumper.

To correct this situation, especially some local governments, press for a super highway so individuals can zip

along in a private automobile to work and back.

The problem that other countries are having now is not having gasoline which is ignored by future planners.

In most cases, there is a railway line in use or abandoned. (I tend to make a funny remark.) In the not very old days, one horse pulled a street car over the rail. How much could one horse pull over: concrete road, asphalt, or a snow-covered street?

One high-ranking official told me that the public does not want to use public transportation. How could they? Where does it go? (Some local transportation) What does it meet? The city buses are located on one street and the out of town buses are located on another street. The highway buses are located on another street again. How about the railway or the airport?

Some cities have union stations, hotels, restaurants, washrooms and smoke shops. One can take a work commuter, rail travel, highway travel in town or out of town. Connections are supreme.

How about cost for all that dream world? It is much less than we think.

Private businesses are paying premium rent for such places. It is an energy saver and money maker. It does not matter how you look at it.

Planning for the future is much more important than we think. We're just hoping that the next generation will not be disappointed when they get there.

We, in the north, could learn so much from other planner's mistakes; just by building in the right place in the first place. Put the railways, through streets. Put industry, small services, large industry and food terminals all in their own corners. Energy Conservation Unlimited:

Nineteen Twenties: The model "T" just started. The family has an inexpensive automobile. The large Texas oil fields started to pour oil in a large way. The Eastern oil fields were hardly tapped. Today a lot of oil fields went dry. Eastern countries are holding their oils back. Some countries had schools closed last winter for lack of heating oil and electricity. In Canada, there are some new oil fields. Some experts estimates are a one year

supply. Canadian tar sands are holding some reserves. Some world experts are estimating oil in 20 years. The famous American pleasure car practically used up the world's oil supply.

We can be looking back sixty years but looking ahead all we can see is some odd 25 years. Some experts think that if we could pump the oil a little slower that it might last longer.

Some scientists are saying that there will always be a new oil discovery, solar energy, fusion, nuclear power and wind power.

Many experts do not care one way or another. We will elect a new government or something.

Energy shortage is real. To leave all the future planning for the governments is not all that good. To send a local politician to the big cities for consultants with $5,000 or $15,000 is not proving much either.

There are many proofs to back this fact.

More do-it-yourself planning should be intensified. There are enough mistakes here now to learn from. The

next page is: "Don't just talk, do something about it."

N.O.E.C.C.

STORING ENERGY

Emergency, instant availability and cost of the stand-by energy replacement

COAL:	Eternity
WOOD:	3 to 10 years or much more, if kept dry
OIL:	Safety container and place, a few years
PARAFIN:	In slab form and candles, many years
HOT WATER:	Costly, a few days
ELECTRICITY:	By very expensive stand-by generating hardware only

Electric interruptions were short and far apart. It is not the electric companies' responsibility how the electricity is to be used. Other legislative bodies should implement safety first controls in all heating units. For example:

Natural Gas: Natural Gas Furances should be controlled by microgenerators and oil. Oil furnaces should have emergency manual starters. Hot air furnaces should have larger heat

exchangers and larger hot air plenums to increase gravity circulation.

We should be spreading the electric peak demand over the 24 hour calendar, using all the above stand-by heating reserves and all the other safety inexpensive fuels. The total dependency on the electrical system would be eliminated. A 10% stand-by for peaking hardware would be more than plenty. Some 7 billion Canadian dollars are less than the 40% which some people think we should have.

If the public is educated ~~be~~ To being prepared with the above type of energy storage especially in the north and by knowing the peak load control system, brown or blackouts would not occur if they did for any reason. The population would not be in any trouble at all. Planning will have to replace the billions of stand-by hardware. It should also stop dumping electric energy at give-away prices, at low demand periods.

CONTROLLING THE PRECIOUS ELECTRIC POWER WE HAVE

The next exhibit is a 24 hour electric calendar. This is a side product from a 1976 electrical panic.

It may not be a bad idea if the general public in the north, (including the professionals) look into the next sketch. It depicts one of the most expensive spare tires in the electrical system. Please refer to Chapter 3; page 9.

The Chapter 3; page 10 suggests an alternative energy storage. In the mid-north (Timmins, Cochrane and Thunder Bay) a gradual secondary heating system should be implemented--fossil burner, wood or coal.

The 24 hour calendar shows the electric curves in this area in December. The peak demand at that time is very expensive in what they call a stand-by hardware. That means to supply electric power at that time. The electric company must maintain more than double of the generating equipment, for the sake of the four hours.

Ontario Hydro is a public corporation. That means that whatever that electric company spends, you the public have to pay.

If that is the case, then the public should have a chance to suggest changes. In any case, as time goes, the general

public seriously should look after themselves as suggested in Chapter 3; page 19. Keep the house and yourself from freezing.

In all cases, it is customary to find the problem. Then try hard to find a cure for the problem.

Northern Ontario has some problems but it has unique potentials to overcome them. But....I don't mean that there are no experts in the south; on the contrary, it seems that they all run down, as soon as possible. It has been that way for a long time.

Those that work underground, work in a forest or work a profession, in a lot of cases experience is gained or money is made.

Those, that for any reason want to or have to live here.

This country could be made as beautiful as any as economical to live in as any but it has to be done by you. The experts from down below and the ones that are waiting for the first chance to go will not do anything for you unless there is some money to be made at your expense.

S. 6B and S. 6B1

The first one describes the electrical problem in 1976 and the suggested remedy to overcome that problem. (The beauty is that not many people knew that there was any electrical problem but there was.) Now 3 short years and some 5 billion dollars later; we have too much electricity.

What does it mean to a northerner? (Timmins, Cochrane, Iroquois Falls and Triangle.) There are three Hydro dams here. When generating 25 cycles of electricity, some of it is exported to Sudbury and some to Kirkland Lake. It is no good to us because we are on the 60 cycle system. Our electricity comes from down below. If something happens to the long transmission, we are out of luck.

This is not intended criticism. Point out to the northern public that for the next 16 years, there is no plan to change any of the electrical system.

In this neighbourhood, there are some water powers, not harnessed as yet. We are short of oil, (rather the globe is short of oil). The water power around here to my estimation, is

somewhere near the amount of 50 Diesel Oil Locomotives. It could be replaced by 50 Electric Locomotives.

The oil cost to feed 50 Oil Locomotives would go a long way to electrify the existing railways. The water runs down the river every hour for nothing. The oil cost is creating a real problem in the world.

Do we need some outside consultants or should we try to do something ourselves, (for ourselves). I mean, the water power is below and above the 50th parallel. I think it would be more beneficial to this area if the 50th line wasn't a division line.

The exhibit S.6B1 is when you find out where the trouble is. The next best thing to do is to do something about it. Please refer to Chaper 3; article 6. The U.S.A. great electric disaster was caused by the domestic demand.

So, according to that, the ordinary home is not co-operating or maybe they don't know how. For example: if there is a voltage drop, (voltage drop means when the electric load is greater

than the generation system is able to supply). When this happens, the supplier notifies the user to shut off anything possible or all.

There is good reason for the industry to shut down in a case like that because low voltage could damage the electric motors or burn them.

What would happen if the housewife was told that the electric power will be off in 15 minutes. They would all jump to get a kettle of hot water before it goes off. Actually, this would do the trick. This has happened. It did happen in the U.S. when the public was told to conserve gasoline; they used more of it. When the food was rationed, the tendency was to use more of it.

Today there are modern countries where the hot water is rationed. Once a week, if you are lucky you can take a bath or wash the clothes.

IF WE CAN, AND WE WOULD, AND WE BETTER, then we don't have to let things go that far down.

Natural Resources is a God-given blessing. Take care of them because it will create jobs, etc. Not many countries

in the world can boast of that kind of reserve.

How do you read the 24 hour calendar? At the top of the sheet, there are 24 sections numbered one to twenty-four. Next, the broken line represents the approximate line that the electric load does not overshoot for approximately twenty hours out of the twenty-four hour day.

The third line is the curves of the actual electrical demand or the actual electricity used. The next line down is the zero line.

The numbered sections are: 1:00 a.m. to 4:00 a.m. A little more is used at 6:00 a.m. #16 or 4:00 p.m. When the heavy peak load starts, it lasts for four to eight hours before it drops back to normal.

S#6 B1. The normal size of an electrical main entrance at the present time is: 100 amp with a 200-500 amp main entrance.

This system suggests a 60 amp electrical main entrance. It's automatic safety features are built in. Trusting the general public with conserving this precious material is no

longer viable. Many countries did try it and it does not work. The way the energy shortage is increasing, the problem will also increase accordingly.

Submission #6 B and #6 B1.

The twenty-four squares represent the 24 hour day. The two vertical dotted lines are what they call the electrical peak demand period. That is the time when everybody wants to do everything, electrically.

(A) is the blue line, electric demand from 1:00 a.m. to approximately 4:00 p.m.

(C) is the highest point during that period

(B) is the red line that is the uncontrollable, most expensive, most troublesome and the most unpredictable period.

The green line is the equalizer. This is the line when enough is enough. That is where one has to draw a line. That is the line where it has to be said: or where the public has to be told: (You don't know how to use the electric power so we are going to shut it off.) I don't mean it as a joke.

Some countries cut off hot water and some heating in schools etc. If by any reason some of us think that this is not going to happen here, we are very badly mistaken.

On the other hand, if we know where the trouble is and that we definitely do, then the next item on the top exhibit is (1) an electric timer that goes on after midnight when the electricity is not used very much anymore. The timer turns on the electric hot water and it stays on until the trouble-some peak demand should come. Then it turns it off again. (2) The hot water tank and hot water blower coil for warm water heating is the other example.

The bottom exhibit is another section of how to get away from the red herring. (The peak demand.) There is more explanation about that system in ths chapter.

This system may cost some money, probably some headaches but on the other hand it would give the Royal Commission on Electric Power Planning a little more time to think and study some of the LESS expensive ways to supply the demands.

#3 This does not have to be a compulsory suggestion. It could be presented as an energy saving incentive system. The less you use, the less you have to pay.

What I am trying to say again, and maybe I am repeating myself, is that this system I am suggesting is for the future's safety of local generating, good to the last drop. (To the last 15 amps of ELECTRIC POWER.)

Some of my submissions are dated in 1976. That is when they were presented to Dr. Porter's future planning commission and filed there ever since, so I am using that date for that reason.

Future planning is much more important in the north than any other area.

(A) The North is a lot of empty space and a lot of it is crown land.

(B) We can cash in on the other fellow's mistakes.

The further north we go, the more important the future planning is.

The automobile companies find it necessary to test their products here. In a way they have to. Car manufacturing

is a very well engineered and a very competitive business.

Building homes, services, transportation: Cost of living, is much more important, unless the local population will point out the proble-s to the Federal and the Provincial Governments. They won't even know what is hurting us.

We have to get out of this danger zone somehow.

Voltage 208 is for general use in colour, in case of voltage drop, or any emergency. The red and blue circuit could be dropped. The black and white could still be maintained.

#1 Appealing to the public by the way of expensive public media to save energy, may be just a waste of public funds. Voluntary restriction never worked before and probably never will. As long as the electric switch is there, someone will put it on and leave it there.

The hydro officials should have some other ways of raising funds for future expansion and save the general public from the expensive and disastrous brownouts and blackouts.

The residential selector system, S. #6 suggests a compulsory 60 amp circuit breakers at minimum cost, 100 amp breakers at premium cost and 200 amp at a penalty cost.

The 60 amp system may not save much energy but it will save the general public from the brown and blackouts.

#2 For the genergal user, this system may not cause much problem. They will learn how to live with it. There may be some surprises though, if they will try to: cook the turkey, dry the clothes, take a shower, plug the car in, use an electric snow blower, use a television or wash the clothes.

Some of the things may not work.

Getting used to this system would take very little time. One can have all the electrical utilities ever. It is still as modern as it can be.

The time is not premature; to seek safety dependability. It takes time to implement any change.

Northern Ontario needs change in the electrical system. Northern Ontario is pretty well fixed for electrical renewable power.

The understanding and the reason, has to start here. In this area, there are three water dams, generating a 25 cycle power and exporting the same to Kirkland Lake, Sudbury etc. Our electric power of 60 cycles are coming from the south. Nuclear and coal are generated; maybe it has to be that way, I don't know. If it is so, let it be. We are burning coal in Toronto to supply us with a peak demand. Would it not be better to burn coal in Onakawana for the same reason?

Harnessing river rapids could be another way of using renewable water power, should the northerners invest in that area? The S #6 could be used with 208 v. four wire system. We have near here some 10,000 H.P. water power that would be sufficient for starting that 208 v. water power. It gradually goes the way to an electric system that could not be overloaded to the breakdown point.

First of all, I would like to make it clear that we are talking about future planning. The Roayl Commission on Electric Power Planning and the

Ontario Government started this over 3 years ago. I am just a participant. Second: The Ontario Hydro is having everything under control at the present, no panic is necessary.

My comments have to do with the present energy problems, when a problem should not be a problem at all.

If there was only a way to reach the public. Ministers of Energy are trying and our local Daily Press is trying. Here in Timmins, a Timmins Public Interests Coalition meeting was held lately with some 18 people attending. Only one of the local government representatives attended. Local education representatives were not present. Provincial representatives from local offices were not present. A host of other public employees making good money locally were not present.

I would like to quote an editorial from "The Environmental Journal", dated Sept. 7, 1976; volume 7 #9. It was read last June 27 - July 1, 1977. ("We have been living under the misconception that if we could just tell people how they could save fuel energy, they would do it. We've

found out now, that isn't true. We are using more fuel today. We are more dependant on imported oil than any time in the past.")

"So it seems that this is the life of today." (Spend all your money, burn all your oil, use up your electricity; when the trouble comes, blame the government.)

At that meeting there were some 1,500 members attending. Most of them were engineers of one kind or another. A few months later in the same area, the cold spell came early. The public used up the heating stock, or did not have any as yet for the new heating season. The St. Lawrence River froze up early. The heating oil could not reach the public in time and the electricity was the only thing that everybody had in the house, so they all plugged in. They used the electric range to try to heat the house and so on.

The result was chaos, frozen bodies, property damage, name it, it happened.

The all electric world just could not stand up to this kind of test. This kind of information should not be kept

from the public.

On the contrary, the early frost was blamed. Wholesale oil companies were blamed for not keeping the oil reserves up.

Now we are hearing the other side of the record, things like "that can not happen here." We have 40% stand-by electricity. Where is it? If something happens to the long transmission we are no better off than the frozen St. Lawrence.

Please do not wait for a disaster to make a move; do something now.

This book is based on safety first. Conserve energy, control the electrical supply, control the humidity stand-by heating system and heating material reserves. Most of that could be done for us, may be a mistake. When trouble comes, everybody is for himself.

At this day and age, the electric powers became so important to life that no other useful element could surpass it.

It is also very essential to invent and implement protective measures so no-one, a small or large user, can jeopardize the rest of the nation. The

cost of suffering and the monetary cost, after an electrical blackout is very hard to ignore, since electrical overloading is probably here to stay. So the next best thing is to prepare for any emergency.

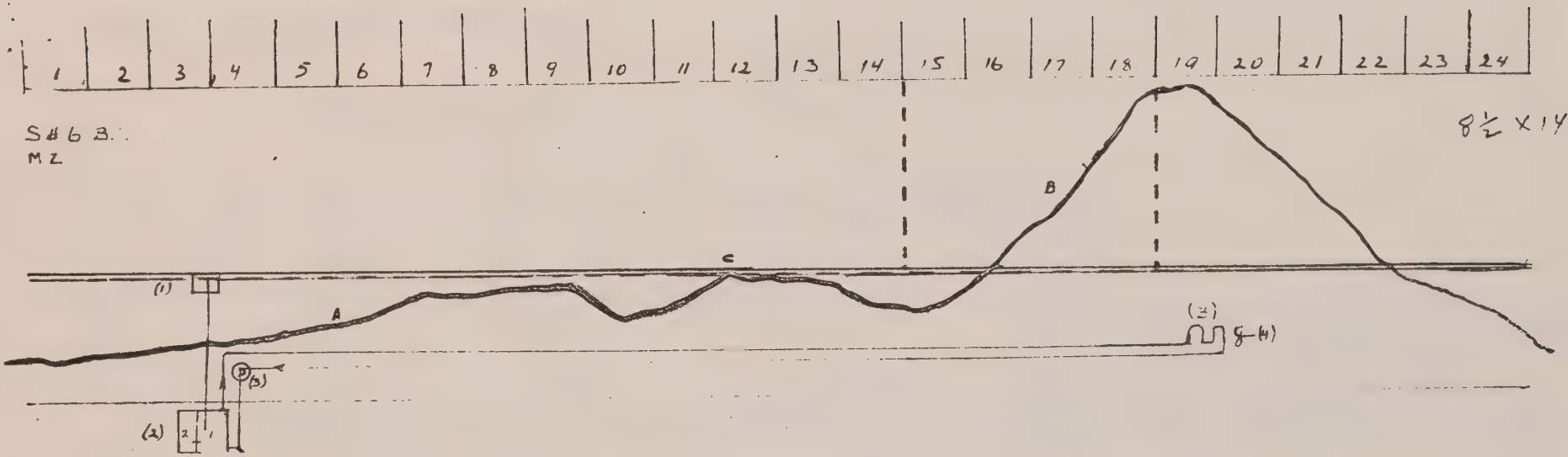
Voluntary restraint or pleading to the public, in general, to conserve will no longer be possible. (Of course voluntary restraint never did work. There are many bitter proofs to that, in many different countries.)

The sooner we realize that electrical controls are a must, the better off we will be. The S. #6 house wiring diagram suggests that in any case, loss of electric volume by the supplier, the continuous panel of 110-115 v.s.ph. circuit 15a. could still be supplied. (Just enough electric power to heat a bowl of soup, keep the cooler going or use the electric blanket.)

With the new homes, it could be quite simple with inexpensive installation. In the existing homes, a line splitter could be installed on the Range cable. Follow the S. #6 wiring system.

The industry could also use this system by selector starters; use two semi-essential loads on one circuit.

KEEP THE HIGH COST OF PEAK LOAD DEMAND IN MIND AT ALL TIMES.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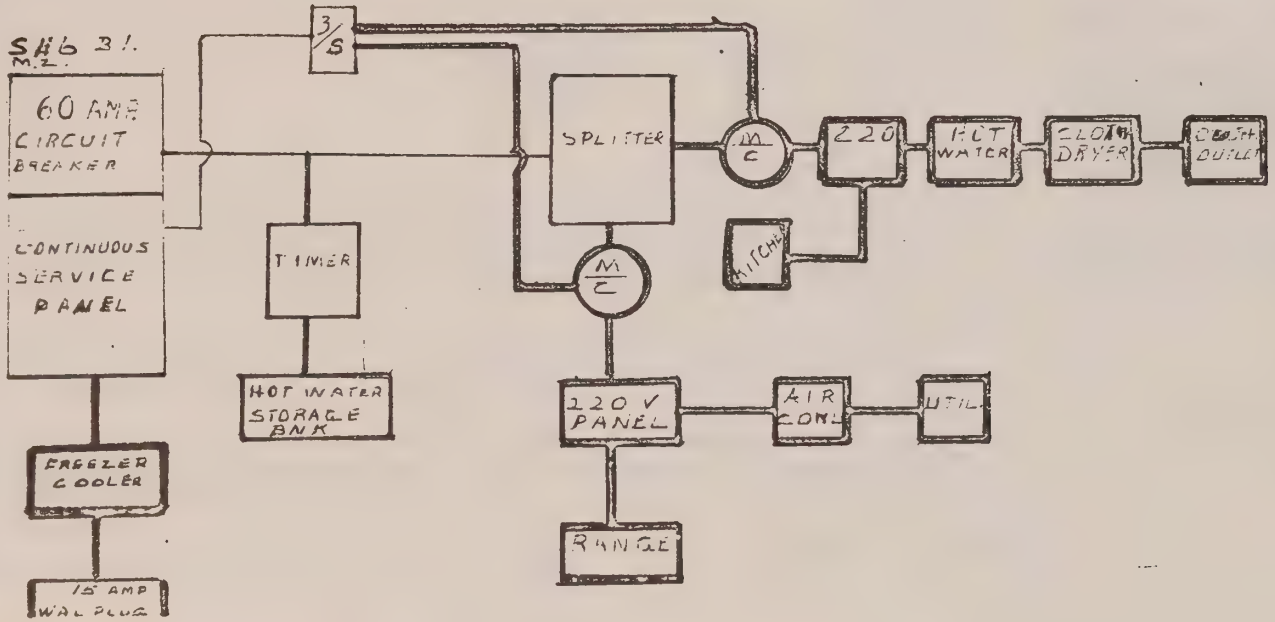
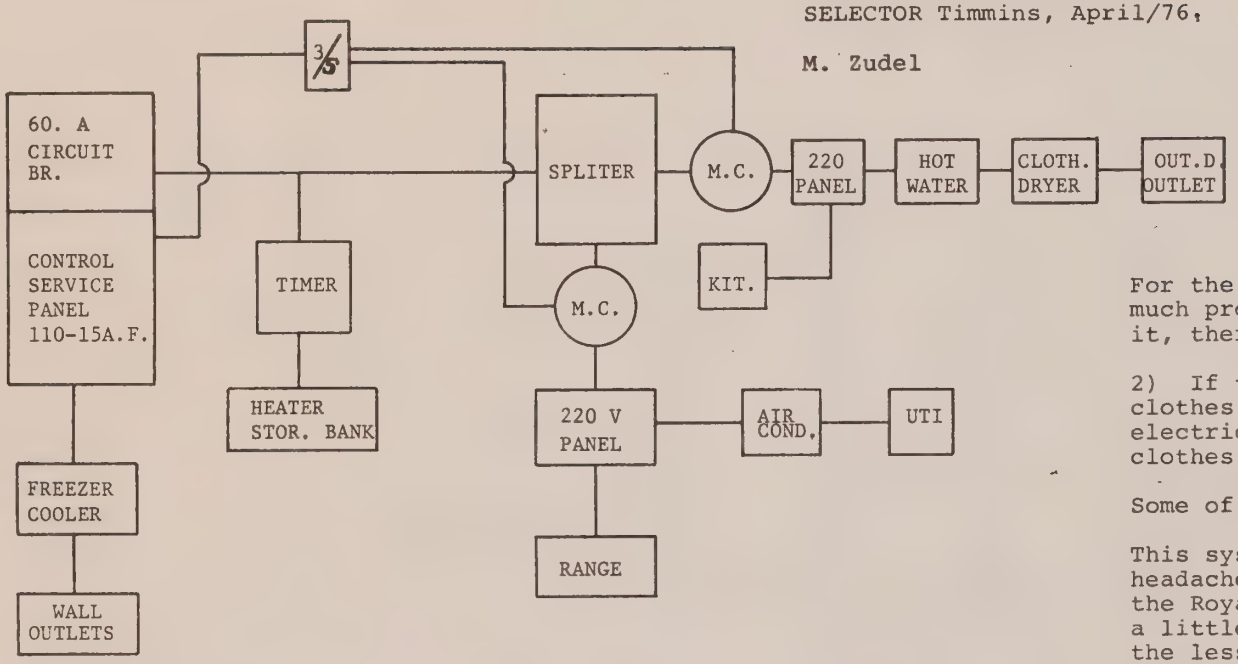

SH 6 B.
MZ
3/S
60 AMP CIRCUIT BREAKER
CONTINUOUS SERVICE PANEL
TIMER
HOT WATER STORAGE BNK
FREEZER COOLER
15 AMP WALL PLUG
SPLITTER
M/C
M/C
220
HOT WATER
CLOTH DRYER
SWITCH
220 V PANEL
AIR COND
RANGE

ELECTRICAL PEAK DEMAND LOAD CONTROL SYSTEM

S.#6 ©/

RESIDENTIAL ELECTRIC LOAD
SELECTOR Timmins, April/76,

M. Zudel



Appealing to the public by the way of expansive public media to save Energy, It may be just a waste of public funds, volontary restriction never worked before and probably never will, as long as the electric switch is there, someone will put it on and leave it there.

The Hydro officials, should have some other ways of raising funds for future expansion, and save the General public from the expensive and disasterous, Brown Outs and Black Outs.

The residential selector system, S.#6 suggests a compulsory, 60 amp. Circuit Breaker, at minimum cost. 100 amp. breakers at premium cost. 200 amp. at a penalty cost.

The 60 amp. System may not save much energy, but it will save the general public from, the Brown and The Black outs.

For the general user this system may not cause much problem, they will learn how to live with it, there may be some surprises though.

2) If they try to; Cook the Turkey, Dry the clothes, take a shower, plug the car in, use electric snow blower, television, wash the clothes,

Some of the things may not work.

This system may cost some money, probably some headaches, but on the other hand it would give, the Royal Commission on Electric Power Planning a little more time to think and study some of the less expensive ways to supply the demands.

This does not have to be compulsory supposition, it could be presented as Energy saving incentive System. The less you use the less you pay.

CHAPTER FOUR

RENEWABLE ENERGY

is

THE MOST IMPORTANT ELEMENT

CONSERVING ENERGY

is

THE SECOND MOST IMPORTANT ELEMENT

HARNESSING RIVER RAPIDS

NO DAM

RENEWABLE ENERGY

Nuclear fuel is not renewable. (Public protests should be noted.) Coal is not renewable, years in reserves are numbered; although the coal could be clean fuel except, the short life of reserves.

Years of oil reserves, are numbered. Oil should be directed to areas where no other fuel is practical or available.

Solar heat is limited in the north, wind power is a possibility for a small supplement.

Local garbage, lumber sawmill waste, paper mill waste are all continuous and renewable.

Forest Waste? Unwanted species of trees, dead trees, logging area, tree-tops and branches; all that is forest waste in enormous miles and quantities. Systematic removal and transfer to energy is unlimited.

River rapids in the north are numerous. Maybe the river rapids are not as efficient as the nuclear generations or as the modern coal burning generator, but, water power is here, it is clean, it is renewable, it could be utilized here; (at the present it is running down the river 24 hours a day for nothing.)

The same thing applies for the forest waste. Enormous quantities of unwanted trees, dead trees, logging sites, tree tops and branches etc.

As I mentioned, that commercial hot houses are badly needed here to supply all the way north. Plastic farms, they all need low heat, So, use the forest waste and local garbage. Heat the water a little higher; run it through an electric turbine (generator) and then use the condenser heat to heat the plastic farms.

The area is too large for any one community. The project could be handled jointly by all the communities. The local rapids and the forest waste could generate some 5 MW of electrical power; the economic block and some major industries could finance the project. The use of electric power? Onakawana, and more rapids up there (no dams) could electrify the railways from Thunder Bay to North Bay and more. The price of oil would not matter much. I am not suggesting to separate from the rest of the province or compete with ~~~ Hydro but looking at the new terrorist war that is on in the globe, the north is a sitting duck. Electricity is our lifeline, the north is not in a very good position rather in an awkward situation. The local governments should look seriously into that.

There is much more to this but the area governments should decide if this "self sufficiency block" is viable, if it is, (I am sure of this) the area is mostly crown land, an aerial map would suffice as soon as the river freezes. Elevation surveys could be continued. We have started, assessment is made to decide what methods of surveying is needed between Sturgeon Falls and Smooth Rock Falls. This is just to tell you that we are not guessing, we are serious. Some universities are promising some engineering help as a field project for the University.

THE COST OF RENEWABLE ENERGY CANNOT BE UNDERESTIMATED

The world's scientists for the last three years were giving estimates for fossil energy reserves in numbers of years; (New discoveries not included.)

Coal 25 years, Oil 10 years, Uranium 30 years, Natural Gas 30 or more years.

Those of us that came to this world with the earth full of oil, natural gas, virgin forests galore. What are we to leave to the ones that are not born as yet? Great national debt, shortage of oil, shortage of food?

What are we waiting for?

There are people today, that have fear to go to sleep because they may freeze before they could wake up.

There are people that are carrying twigs on their backs, dry tree branches, anything that would make heat or boil the water.

There are places that when winter comes schools are closed, some factories are closed for shortage of heat and electricity.

We are lucky, we still have natural resources for sale; how long will that

last if not regenerated properly.

Some people believe in miracles. Others let George do it, and of course a whole lot of them live on borrowed time and money, so the other generation will find a whole lot of bills to pay.

ENERGY

NEW RENEWABLE FOSSIL, NEW RENEWABLE WATE

There is so much of that all around us, all we need to do is to learn how tc utilize it.

In this area and this country there are renewable natural resources that a man can use for himself.

Man made many bad mistakes in the last few decades from which many lessons could be learned.

In the north a lot of unspoiled natural resources and land still exist. The suggested economic block is one of them. Careful planning could probably

eliminate some of the past disorganized communities that sprung up in the wrong places and the wrong side of the track.

For the last two centuries, in the so called civilized societies, the radical changes were popping up centuries apart, then half of the century; now they seem to be popping up in a few short years.

Looking back into a very short history, there should be no doubt in our minds that organized planning is needed; and needed fast.

We are still selling, there are not many countries or nations that can do just that.

Before we are sold out, some alternatives should be ready or near ready.

WATER POWER IN THE PROVINCE OF ONTARIO

This list was originally published

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One request from Mr. C. C. Cunningham (Ontario Hydro Manager for the Timmins area) it was given to me by Mr. F. M. Near, c/o Energy and Environmental Studies Department and by Mr. H. E. Perks of the generation concept, Department O.H.

In 1946 the total water power in Ontario was approximately 6,334,298 HP. Out of that are rapids that the head would be too low, or the volume too small. For harnessing, there was approximately 1,189 HP. The installed HP was 2,673,290.

The balance of water power available on this type of harnessing is approximately 3,659,819 HP.

How much of this water power was utilized since 1946 is not known to me, but on checking the areas, it seems that there are either poor chances for conventional water dams, or that there was no one to raise the river bed.

So according to this information the river rapids are very promising for new renewable energy.

Further experimentation could harness the sea tides, or any water power that has volume and at least 4 feet drop, even 3 to 4 miles distance.

The wind power is coming. The solar power is coming, but the clean water power is here now.

Minutes of one of the NOECC 03/07/79 M. Zudel presented a brief on the Timmins' three Hydro generating plants which are generating 25 cycle electric power. We are exporting the same to Sudbury, Kirkland Lake, etc.

Timmins is importing a 60 cycle power from a 60 cycle grid.

Mr. A. Pope, MPP, raised a question: "How much would it cost to convert the 25 cycle power plants to a 60 cycle?" This area is using 60 cycle.

M. Zudel replies: "Converting as such would not be very practical (just now). It's not just the power plant that needs conversion. A lot of people and industry are attached to the system which is too costly to disturb." There was just a short answer and comment on that subject.

If any money could be spent in this area, spend it to add a new 60 cycle electric power for this district.

The future planning should be such that conversion, moving the railway lines, by-passes will not be necessary. Example: in the north about 60% of new housing is being built with

electrical resistance, installed heating and with inferior standards of insulation.

Some five years ago, I made some comments on electricity, insulation and installations that were not designed for the northern region, or could have been considered for a second look.

Insulation methods are described in Chapter Two. Saving heat in this area is one of the most urgent needs.

(Holding electrical installations to the 8% that the council suggests, should be seriously respected in the future.)

(We will have enough electricity in the north, according to the article of the Science of Canada. "There is enough electricity till the 21st century if?)

According to the Ontario Hydro there are no plans for electrical

12.

expansion for the next 16 years.

I would beg especially the local government, why we should start planning immediately especially in the electrical Hydroelectric field.

(a) The electricity generated here is a wrong cycle. The 60 cycle electric power is imported by a long transmission. This area is almost totally dependent on electric power, oil furnaces, natural gas furnaces and electrical heating in a large way.

(b) We have unharnessed water power. There is a great deal of waste from the forest, garbage etc., which can be best utilized by generating electricity.

(c) If we generate a 60 cycle electric power here, we would not have to depend on the long transmission.

(d) A four wire 208 V electrical system could be wired good to the last fifteen amp electricity. This is the

best for the north.

LOCAL GOVERNMENT: PLEASE REFER TO CHAPTER 3; PAGE 7.

Possibly all buildings should be provided with a double flue. There is no panic for that, but remember the future has a lot of tricks for the next generation. Don't let them down, but on the other hand don't make them think that the world owes them a living. God helps those that help themselves.

WATER POWER

My first concern of new renewable energy would be the water power.

Approximately 24 miles down stream from Timmins; Sturgeon Falls, 25 cycle generator, Head 42 feet; 8,000 HP generator, feeding a transmission to the south.

Approximately 1.4 miles down stream Twin Rapids approximately 10 foot head, not harnessed; approximately 1,9-0 HP.

Approximately 20 miles are Loon Rapids, maximum HP 880.

Two miles down stream are Davies Rapids not listed not harnessed.

2.5 miles down stream are Yellow Falls; 44 foot head, minimum flow of 5,608; HP 8,188; not harnessed.

1.4 miles down stream are Island Falls; head 17 foot; 2,167; 3.164 HP.

All this water power is on one river approximately 5 miles area; and it could be tied to the Smooth Rock Falls transmission; one could be tied to the Sturgeon Falls transmission; or all combined could serve the suggested Self Sufficiency Block.

The size of the chute depends on the volume of water or seasonal fluc-

tuation of the river flow; but the size of power wheel in this system is the larger the wheel, the larger the torque at the axle point.

(1) Concrete foundation for the dyke or a curb.

(2) A back fill not less than 5'-0 at least 100' up stream to form base (smooth concr.) 10% grade min.

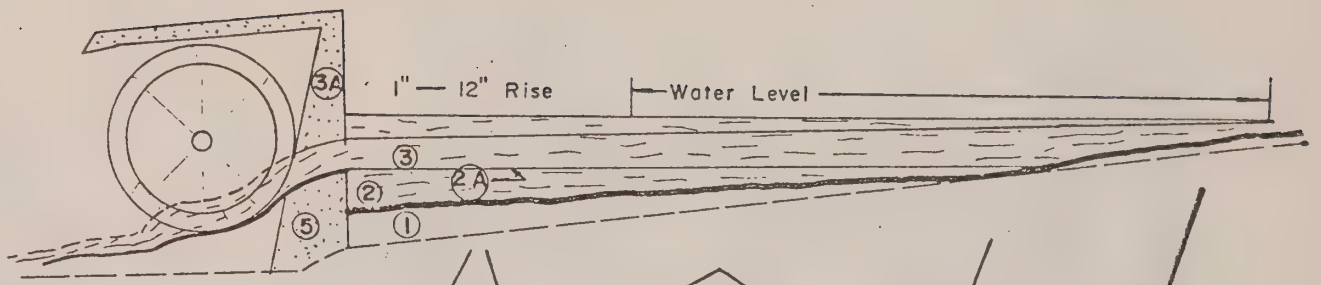
(3) Water flow for the generator.

(3a) Enclosure for the paddle wheel.

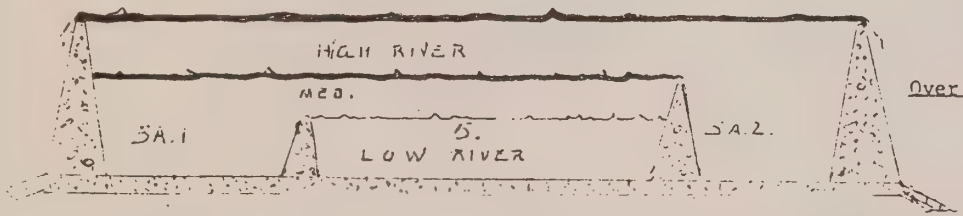
(4) Guiding curbs.

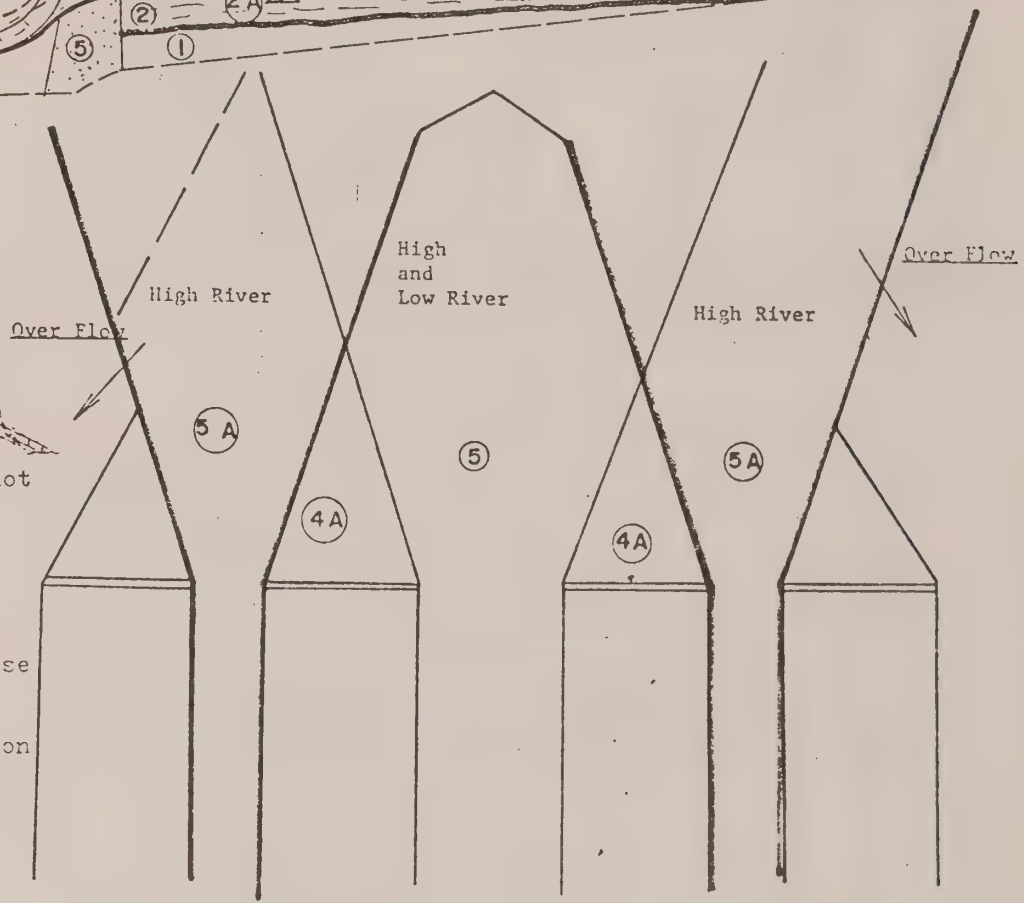
(5) Water runway to the generator gate arrow points to the flood water run off.

(5a) The curb is higher here in case water flow is too low; only #5 would operate.



How to raise the River bed.

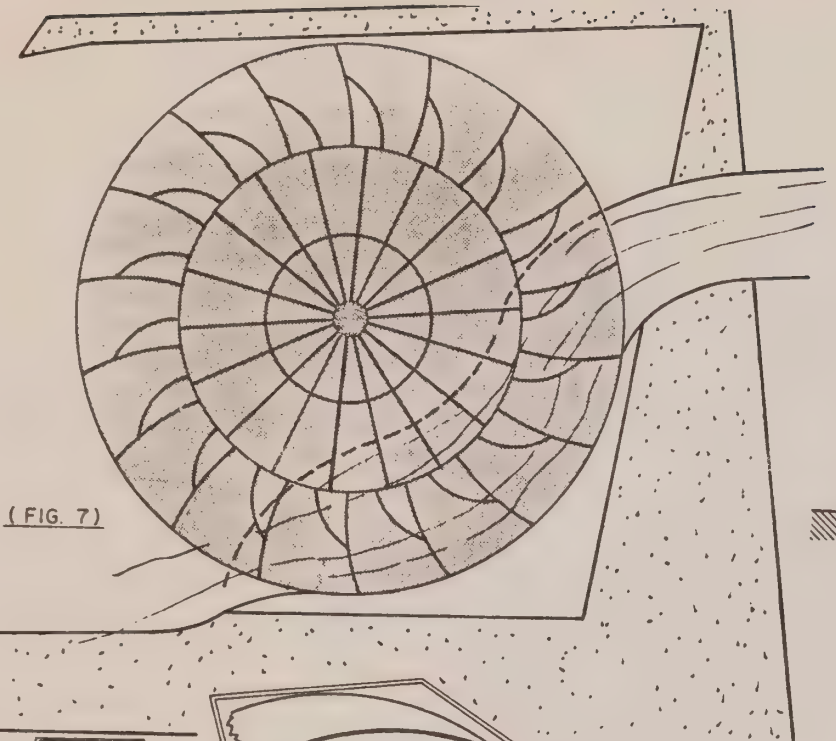




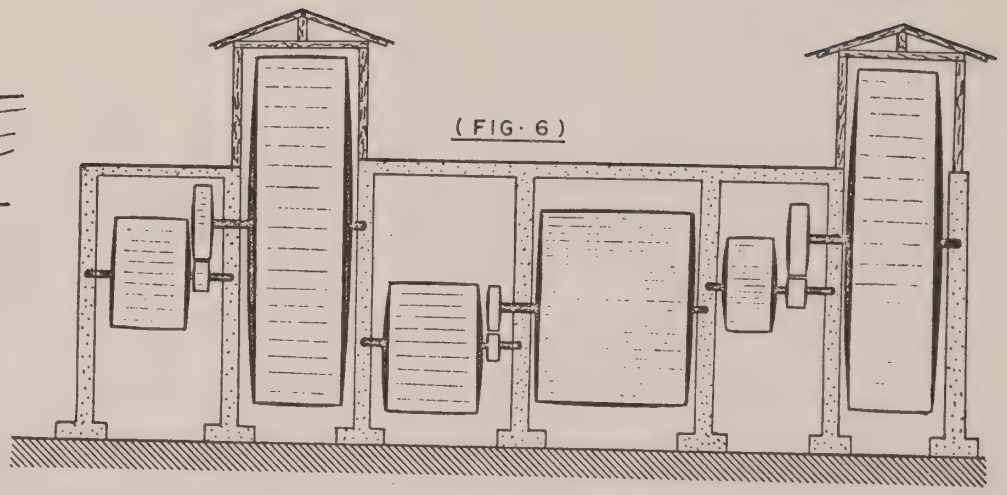
River rapids are usually in an area where hydro dams are not possible, but usually near exsisting transmission, The exh. E. Suggest a system that could use a slow river current for geared up generating speed. This is a cousin of the old flour mill, exept it is an upside down version, Light metal construction wheel, a close match chute to raise the torque by the piston effect of the chute and wheel combination. The head frame and catch basin depends on the river rapids, Could be;Concrete tubes over rock fill. Concrete tubes over ; Truss Bridge. Concrete Curbs, rock fill between the curbs and a trough over the rock.

W. E.

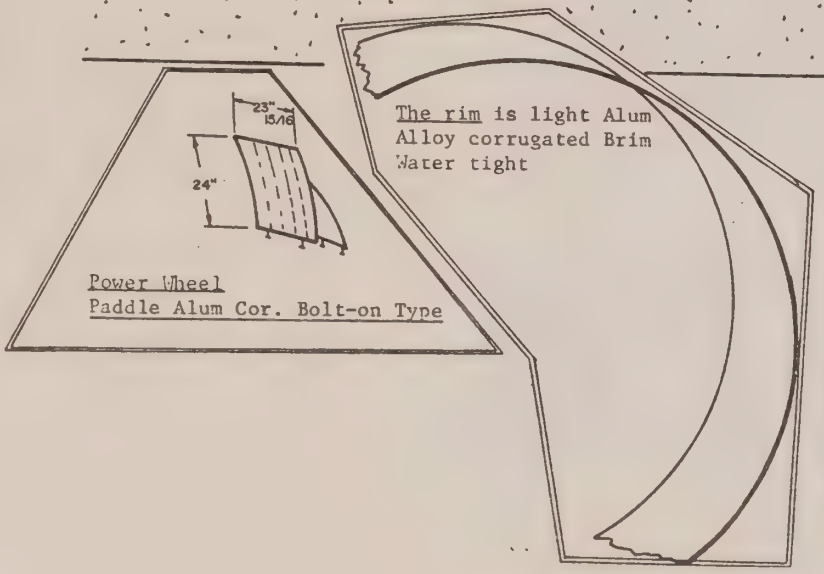
Exhibit



(FIG. 7)

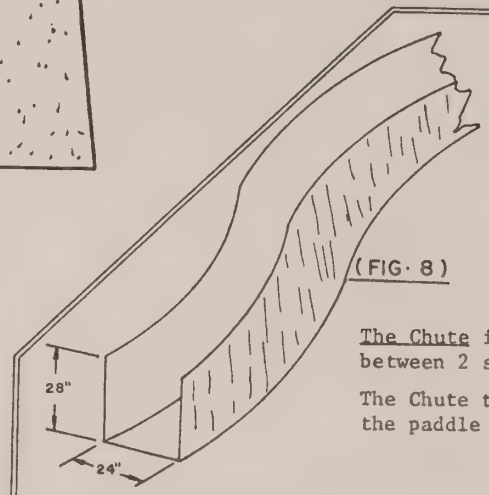


(FIG· 6)



Power Wheel
Paddle Alum Cor. Bolt-on Type

The rim is light Alum Alloy corrugated Brim Water tight

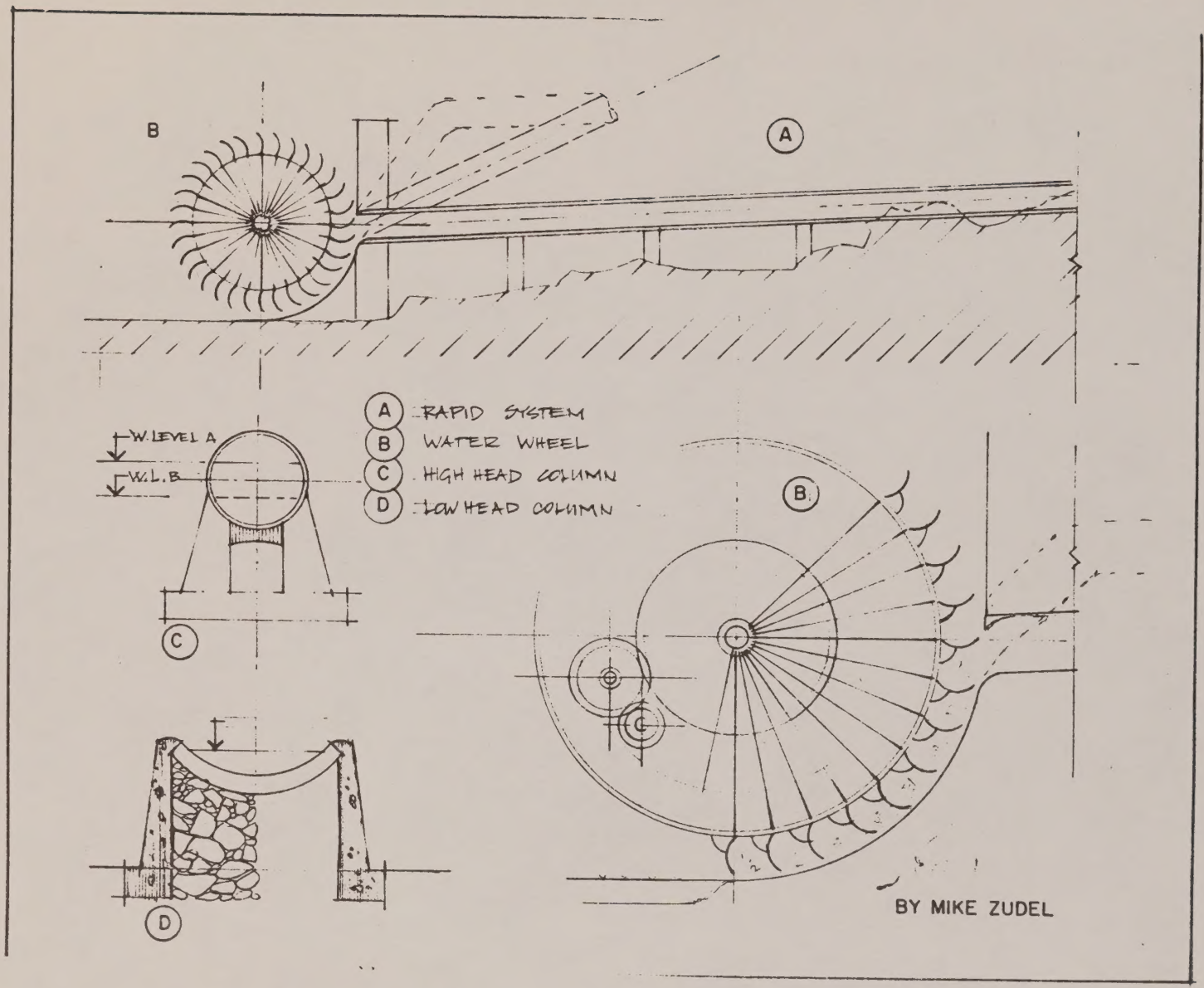


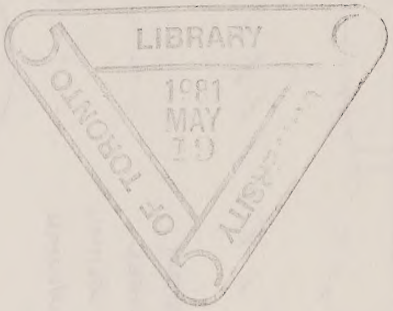
(FIG· 8)

The Chute is metal could be stainless steel between 2 solid concrete walls.

The Chute trough, rim of the power wheel, and the paddle forms a piston type power.

The size of this unit depends on the volume of water available.


B
A
W.LEVEL A
W.L.B
C
D
A RAPID SYSTEM
B WATER WHEEL
C HIGH HEAD COLUMN
D LOW HEAD COLUMN
B
BY MIKE ZUDEL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